

# **2024 IEEE SENSORS**

**Kobe, Japan  
20-23 October 2024**

**Pages 1-673**



**IEEE Catalog Number: CFP24SEN-POD  
ISBN: 979-8-3503-6352-4**

**Copyright © 2024 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

|                         |                   |
|-------------------------|-------------------|
| IEEE Catalog Number:    | CFP24SEN-POD      |
| ISBN (Print-On-Demand): | 979-8-3503-6352-4 |
| ISBN (Online):          | 979-8-3503-6351-7 |
| ISSN:                   | 1930-0395         |

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# TABLE OF CONTENTS

|                                                                                                                             |    |
|-----------------------------------------------------------------------------------------------------------------------------|----|
| An Inkjet-Printed Stretchable Sensor Patch for Multimodal Physiological Monitoring .....                                    | 1  |
| <i>Wei Ling, Xue Shang, Junchen Liu, Tao Tang</i>                                                                           |    |
| Influence of Scallops in Deep Reactive Ion Etching on Vertical Comb-Based Sensors/Actuators .....                           | 5  |
| <i>Yuhu Xia, Biyun Ling, Bo Chen, Xiaoyue Wang, Biqing Zhou, Yaming Wu</i>                                                  |    |
| Quality Factor Optimization and Thermal Noise Analysis of Silicon MEMS Resonators* .....                                    | 9  |
| <i>Zheng Fan, Zhu Li, Renguang Tang, Guanhua Wu, Shanqing Yang, Liangcheng Tu, Yuan Wang, Pui-in Mak</i>                    |    |
| Homo-Thermocouple Fabricated by Selective Laser Sintering and Melting of Semiconductor Nanoparticles.....                   | 13 |
| <i>Xiangyu Chen, Jianqin Zhu, Lu Qiu</i>                                                                                    |    |
| Remote Gait Behavior Monitoring System for Older People Based on Wearable Sensor.....                                       | 17 |
| <i>Meiyan Zhang, Boqi Zhao, Jingxiao Liao, Qisong Wang, Dan Liu, Jinwei Sun</i>                                             |    |
| NiO-Doped Laser-Induced Graphene: A High-Performance Flexible Temperature Sensor .....                                      | 21 |
| <i>Shaogang Wang, Chuanjian Tan, Qihang Zong, Avik Sett, Huaiyu Ye, Paddy French</i>                                        |    |
| Fruity Twin – A Digital Platform for Processing Sensor Data in Food Cool Chains.....                                        | 25 |
| <i>Reiner Jedermann, Tuany Gabriela Hoffmann, Akshay D. Sonawane, Pramod V. Mahajan, Björn Lüssem</i>                       |    |
| Companding Curve Optimization to Maximize SNDR for High Dynamic Range Image Sensors .....                                   | 29 |
| <i>HoJoon Lee, SeungHyung Lee, Oded Drori, KyungChoon Lee, YoungKyun Jeong</i>                                              |    |
| A Flexible Capacitive Pressure Sensor with Improved Sensitivity Over a Broad Pressure Range.....                            | 33 |
| <i>Chunyu Lv, Siyi Wei, Ye Li, Tao Lv, Qi Li, Yang Liu, Mengying Xie</i>                                                    |    |
| Topology Reconstruction Approach for Distributed Blind Equalization Over Sensor Network .....                               | 38 |
| <i>Sulin Chi, Tetsuya Shimamura</i>                                                                                         |    |
| Broadband Terahertz Metamaterial Absorber Based on Laser Reduced Graphene Oxide Films .....                                 | 42 |
| <i>Hao Wu, Xiaomeng Bian, Misheng Liang, Rui You</i>                                                                        |    |
| Helios, a Contactless Optical Sensor for the Assessment of Transmission Line Conductors Peripheral Solar Absorptivity ..... | 46 |
| <i>J. Bellemare, V. Quenneville-Guay, M. Nourry, P.-L. Richard, M. Doucet, O. Pancrati, N. Pouliot</i>                      |    |
| A Binary Frequency Shift Keying Chipless RFID IoT Switch.....                                                               | 50 |
| <i>Abdullah S. Almansouri</i>                                                                                               |    |
| Finite Time Stabilization of Coupled Network by the Adaptive Event-Triggered Control .....                                  | 54 |
| <i>Wei Zhao, Jianquan Lu, Jinling Liang</i>                                                                                 |    |
| Channel Assessment for a Sensor System for Status Detection of Miniature Circuit Breakers .....                             | 58 |
| <i>Andreas Port, David Salido-Monzú</i>                                                                                     |    |
| Average Capacity Analysis and Power Allocation for Data-Gathering Wireless Sensor Networks .....                            | 62 |
| <i>Youyang Xiang, Qilong Du, Xianglu Li, Xianhua Shi, Peng Fei, Dong Hou, Jie Tian</i>                                      |    |

|                                                                                                                                                                         |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Vapour Recognition Based on Deep-Convolutional Neural Network: Portable Impedance Analyzer .....                                                                        | 66  |
| <i>E. Vercoutere, S. Kenne, C. Morchain, S. Pecqueur, B. Hafsi</i>                                                                                                      |     |
| Semantic Landmark Detection & Classification Using Neural Networks For 3D In-Air Sonar .....                                                                            | 70  |
| <i>Wouter Jansen, Jan Steckel</i>                                                                                                                                       |     |
| Increasing the Diversity in RGB-to-Thermal Image Translation for Automotive Applications .....                                                                          | 74  |
| <i>Kaili Wang, Leonardo Ravaglia, Roberto Longo, Lore Goetschalckx, David Van Hamme, Julie Moeyersoms, Ben Stoffelen, Tom De Schepper</i>                               |     |
| Pipelines Leak Localization Through Acoustic Emission and Deep Learning .....                                                                                           | 78  |
| <i>Felipe Messias Priotto, Diego Siedel Bertolini, José Jair Alves Mendes Júnior, André Eugenio Lazzaretti, Lúcia Valéria Ramos de Arruda, Raphael Marinho Teixeira</i> |     |
| High Sensitivity Lateral Hall Device in Silicon on Insulator (SOI) Platform .....                                                                                       | 82  |
| <i>Guiqiang Zheng, Qingyin Zhong, Jie Ma, Yichen Li, Nannan Cheng, Nailong He, Sen Zhang, Yongjia Li, Long Zhang, Siyang Liu, Weifeng Sun</i>                           |     |
| Development of Virtual Lock-in Amplifier for Fluorescent Flow Cytometry .....                                                                                           | 86  |
| <i>Yongfan Chen, Chiyuan Gao, Junbo Wang, Deyong Chen, Xiaoye Huo, Jian Chen</i>                                                                                        |     |
| Development of Plane Bending Fatigue Tester for Electrode Materials of Lithium-Ion Battery by Using Strain Sensors.....                                                 | 90  |
| <i>Atsuki Takeuchi, Yudai Furuhashi, Yoshinao Kishimoto, Yukiyo Kobayashi, Masaya Ueda, Shiori Tagai</i>                                                                |     |
| Design of an Ultra Low-Power Glass-Based Micro-Hotplate with Thermal Isolation Structure .....                                                                          | 94  |
| <i>Xiangyang Wei, Yi Chen, Wenhao Yu, Hailong Liu, Rui You</i>                                                                                                          |     |
| Flexible Sensing Skin for Simultaneous Measurement of Wall Shear Stress, Flow Direction and Dynamic Pressure.....                                                       | 98  |
| <i>Peng Pang, Jianing Zhang, Chenhao Luo, Binghe Ma, Xingxu Zhang, Jian Luo, Jinjun Deng</i>                                                                            |     |
| Chinese Paper-cutting Inspired Topological Flexible Piezoresistive Pressure Sensor for Wearable Health Monitoring .....                                                 | 102 |
| <i>Lukang Wang, Jinjin Cao, Ming Liu, Yi Lv</i>                                                                                                                         |     |
| Copolymerized Ion-Gel for Dimethyl Methylphosphonate Sensing: from Material to Multi-type Sensor Applications .....                                                     | 106 |
| <i>Yubin Yuan, Qianyi Yang, Qiang Wu, Long Hu, Li Ni, Yang Zhou, Chuanyu Han, Xin Li, Weihua Liu</i>                                                                    |     |
| Opto-Microfluidic Lab-on-a-Chip Characterization of Yeast Suspension Using Monte Carlo Method-Based Light Extinction Model .....                                        | 110 |
| <i>Hsin-Yu Chuang, Kuan-Hua Chen, Quoc-Thinh Dinh, Shuo-Chih Chien, Cheng-Yang Liu</i>                                                                                  |     |
| Development of a Personalized Anomaly Detection Model to Detect Motion Artifacts Over PPG Data Using Catch22 Features .....                                             | 114 |
| <i>Andrea Valerio, Danilo Demarchi, Brendan O'Flynn, Salvatore Tedesco</i>                                                                                              |     |
| Singularity-Enhanced Deep Sub-Linewidth Mode Matching of the Disk Resonator Gyroscope.....                                                                              | 118 |
| <i>Sen Zhang, Xingjing Ren, Ying Ouyang, Xin Zhou</i>                                                                                                                   |     |
| A Flexible and Self-Powered Chitosan-BaTiO <sub>3</sub> Composite Pressure Sensor for E-Skin Applications.....                                                          | 122 |
| <i>Zhao Wang, Bhavani Prasad Yalagala, Hadi Heidari, Andrew Feeney</i>                                                                                                  |     |

|                                                                                                                                          |     |
|------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Thin Film Strain Sensors with Significantly Improved Piezoresistive Stability at High Temperatures by Introducing Insulating Phase ..... | 126 |
| <i>Tao Zhang, Yilin Fan, Yu Lei, Xingxu Zhang, Jian Luo, Jinju Deng, Tao Ye, Binghe Ma</i>                                               |     |
| Harnessing the Fourth Dimension Through Nonlinear Damping in Optical Fiber Flow Sensing .....                                            | 130 |
| <i>Jeremiah C. Williams, Hengky Chandrahali</i>                                                                                          |     |
| Generation of Microdroplet lens for Surface-Enhanced Raman Spectrometry Analysis for Sample Detection .....                              | 134 |
| <i>Chia-Wen Tsao, Zi-Yi, Yang</i>                                                                                                        |     |
| Active Sensing Based Quaternary Mixture Odor Quantification Using Viscous Coated QCM Sensor Array with Multiple Harmonic Responses ..... | 138 |
| <i>Ziteng Bao, Manuel Aleixandre, Takamichi Nakamoto</i>                                                                                 |     |
| A 0.45°/h Lissajous Frequency-Modulated MEMS Gyroscope .....                                                                             | 142 |
| <i>Wenyuan Tong, Xudong Zheng, Xuotong Wang, Lina Ju, Fu Wang, Ming Zhou, Yaojie Shen, Chen Fang</i>                                     |     |
| Monolithic Integration of Audio Filters for Frequency Response and THD Modulation in MEMS Microspeaker .....                             | 146 |
| <i>Yu-Chen Chen, Hsu-Hsiang Cheng, Ming-Ching Cheng, Zih-Song Hu, Weileun Fang</i>                                                       |     |
| Study on Vibration Characteristics of Bolted and Bonded Joints by Using Acceleration Sensors .....                                       | 150 |
| <i>Shogo Isobe, Tristan Samuel Britton Fujimori, Yoshinao Kishimoto, Yuki Yoshi Kobayashi, Keisuke Inoue</i>                             |     |
| Structure Deformation Measurement Based on Magnetoelectric Effect .....                                                                  | 154 |
| <i>Yikun Yang, Yahui Zhang, Haomin Wu, Tian Xia, Bintang Yang</i>                                                                        |     |
| Analysis of Effects of Sensor Error Factors on Attitude and Heading Errors for Inertial/Magnetic Sensor-based Stationary Alignment.....  | 158 |
| <i>Chang June Lee, Jung Keun Lee</i>                                                                                                     |     |
| YOLO-ICP: Deep Learning Integrated Pose Estimation for Bin-Picking of Multiple Objects .....                                             | 162 |
| <i>Huajian Li, Ivan Kraljevski, Paul Meyer, Constanze Tschöpe, Matthias Wolff</i>                                                        |     |
| Liquid Metal Flexible Pressure Sensor Based on Femtosecond Laser Direct Writing Microchannel .....                                       | 166 |
| <i>Luyao Zhang, Misheng Liang, Wanquan Liu, Xiaomeng Bian, Rui You</i>                                                                   |     |
| Imaging of Sr-90 Radionuclide Sources Based on Diamond Pixel Detectors .....                                                             | 170 |
| <i>Marco Girolami, Sara Pettinato, Daniele M. Trucchi, Stefano Salvatori</i>                                                             |     |
| A Gelatin/Activated Carbon Multifunctional Coating for Future Edible Diagnostic Systems .....                                            | 174 |
| <i>Valerio F. Annese, Giulia Coco, Valerio Galli, Elda Sala, Mario Caironi</i>                                                           |     |
| Numerical Temperature Analysis of the Double-Side Photonic Thermal Sensor System with Janus Radiation Cooler.....                        | 178 |
| <i>Kuan-Hua Chen, Hsin-Yu Chuang, Wei-Yu Chen, Yu-Bin Chen, Cheng-Yang Liu</i>                                                           |     |
| Optimal Growth Conditions for Human Endometrial Stromal Cells in a Bidirectional OoC with Porous Membrane.....                           | 182 |
| <i>Pin-Yao Lee, Yi-Wen Wang, Ying-Fang Chang, Ming-Jyh Chang, Yi-Wei Lin, Yi-Wei Lin, Hong-Yuan Huang, Da-Jeng Yao, Da-Jeng Yao</i>      |     |

|                                                                                                                                                    |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Digital Magnetic Proximity Extension RPA-CRISPR/Cas12a-Assisted Immunoassay with Attomolar Sensitivity.....                                        | 186 |
| <i>Fangchi Shao, Jiumei Hu, Kuangwen Hsieh, Pengfei Zhang, Pataraiarin Akarapipad, Joon Soo Park, Hanran Lei, Tza-Huei Wang</i>                    |     |
| Effective Compensation of the Piezo-Hall Effect in CMOS-integrated 3D Hall Sensors .....                                                           | 190 |
| <i>Anja Fleck, Martin Cornils, Laurent Osberger, Oliver Paul</i>                                                                                   |     |
| Sensitivity-Enhanced Non-Invasive Glucose Sensor Using Interdigital Capacitors .....                                                               | 194 |
| <i>Shasha Yang, Shiwen Gao, Yi Zhuang, Lili Gao, Zhenxiang Yi</i>                                                                                  |     |
| Creep Property of Polyvinylidene Fluoride in Water When Used as Binder for Battery Electrodes.....                                                 | 198 |
| <i>Shiori Tagai, Masaya Ueda, Yoshinao Kishimoto, Yuki Yoshi Kobayashi, Atsuki Takeuchi, Yudai Furuhashi</i>                                       |     |
| Aptamer Assisted Simultaneous Detection of Lead and Arsenic in Water Using a Handheld System .....                                                 | 202 |
| <i>Swati Mohanty, Partha Pratim Goswami, Gajendranath Chowdary, Shiv Govind Singh</i>                                                              |     |
| Spatial Transepithelial Electrical Resistance Profiling with Multi-Electrode Array for Nondestructive Cell Culture Model Monitoring.....           | 206 |
| <i>Joowon Seo, Joosoon Baek, Taewan Kim, Jaegon Kim, Sungjae Ha, Sung Jae Kim</i>                                                                  |     |
| A Novel High-Performance Miniaturized MEMS Gyroscope North Finding System Utilizing Rotation Modulation Technique .....                            | 210 |
| <i>Xueling Zhao, Haixia Li, Rong Zhang</i>                                                                                                         |     |
| Thermal Image-Based Bed Monitoring System Using VLP Model for Elderly Fall Prevention.....                                                         | 214 |
| <i>Ping-Hung Hsieh, Po-Ting Lee, Jia-Han Yang, Pi-Shan Sung, Chih-Lung Lin</i>                                                                     |     |
| Estimation of Stress Distribution at Adhesive Edge by Inverse Analysis of Deformed Shape Data .....                                                | 218 |
| <i>Toshiya Takeda, Daiki Ariyama, Yoshinao Kishimoto, Yuki Yoshi Kobayashi</i>                                                                     |     |
| A Wireless Facemask for Ultrafast and Continuous Tracking of Breath CO <sub>2</sub> Patterns.....                                                  | 222 |
| <i>Xubin Zheng, Qingpeng Cao, Di Wang</i>                                                                                                          |     |
| A > 70dB Digital Readout Circuit Implemented in 65nm CMOS for 10 $\mu$ m SWIR InGaAs Pixels .....                                                  | 226 |
| <i>Rico Jossel Maestro, Patrick Merken, Filip Tavernier</i>                                                                                        |     |
| Characterization of Vibration Sensitivity of One-Port and Two-Port MEMS Microphones .....                                                          | 230 |
| <i>Francis Doyon-D'Amour, Carly Stalder, Timothy Hodges, Michel Stephan, Lixiue Wu, Triantafillos Koukoulas, Stephane Leahy, Raphael St-Gelais</i> |     |
| Dynamic Error Reduction in Soft Tactile Sensors by Optimum Material Selection.....                                                                 | 234 |
| <i>Dirk Ettelt, Nicolas Dupré, Jeroen Didden, Théo Le Signor, Gaël Close</i>                                                                       |     |
| Magnetoelastic Torque Sensor with GaAs Hall Plates for E-Bikes.....                                                                                | 238 |
| <i>Enrico Gasparin, Bruno Brajon, Lucian Barbut, Nicole Yazigy, Gaël Close</i>                                                                     |     |
| Modeling of Hall-Based Magnetoelastic Torque Sensors.....                                                                                          | 242 |
| <i>Nicole Yazigy, Enrico Gasparin, Bruno Brajon, Lucian Barbut, Gaël Close</i>                                                                     |     |
| Fabrication and Assembly of All-quartz Integrated Resonant Accelerometer with High Stability.....                                                  | 246 |
| <i>Hong Xue, Shengxiang Zhou, Kai Bu, Zichao Zhang, Yulong Zhao, Cun Li</i>                                                                        |     |
| Graphene Electric Field Sensor for Lightning Detection .....                                                                                       | 250 |
| <i>Afsal Kareekunanan, Jiali Hu, Muhammed Razzakul Islam, Takeshi Kudo, Takeshi Maruyama, Atsushi Nishizaki, Yuki Tokita, Hiroshi Mizuta</i>       |     |

|                                                                                                                                                                    |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Visual and Inertial Sensor Fusion Approach for Visual Inertial Odometry Used in Vehicle Localization .....                                                         | 254 |
| <i>Hyunseup Jo, Sang Won Yoon</i>                                                                                                                                  |     |
| Development of a Portable Optical Sensor for Low-Concentration Copper Sulfate Detection in Water .....                                                             | 258 |
| <i>Yu-Chen Hsu, Ciao-Ming Tsai, Wei-Yi Kong, Zong-Yi Cai, Weileun Fang, Cheng-Hao Ko</i>                                                                           |     |
| TFT-based Piezoelectret Sensor for Arterial Pulse Measurement.....                                                                                                 | 262 |
| <i>Chao Ren, Jiani Xu, Zeyuan Cao, Junchi Teng, Xiongying Ye</i>                                                                                                   |     |
| Flexible Electrochemical Biosensor with Graphene and Gold Nanoparticle Modification for Enhanced e-ELISA Point-of-Care Biomarker Detection .....                   | 266 |
| <i>Zahrasadat Hosseini, George Jie Yuan</i>                                                                                                                        |     |
| Radioluminescent Nuclear Battery for the Application of Self-Powered Sensors.....                                                                                  | 270 |
| <i>Tongxin Jiang, Sijie Li, Xin Li, Xue Li, Lifeng Zhang, Haisheng San</i>                                                                                         |     |
| Adaptive Filter to Remove Motion Artifacts from GSR Sensor Embedded on Handle Cane .....                                                                           | 274 |
| <i>Rafael Villalba-Bravo, Andrés Trujillo-León, Fernando Vidal-Verdú</i>                                                                                           |     |
| Evaluating 3D Depth Sensors: A Study and an Open Source Data Set of Logistic Scenarios.....                                                                        | 278 |
| <i>Sebastian Hoose, Felix Warmuth, Jan Finke, Christopher Rest, Jonas Stenzel, Jana Jost</i>                                                                       |     |
| Perfume Reproduction Analysis with Robustness Against Interference Using Improved NMF in Mass Spectrum Space.....                                                  | 282 |
| <i>Dani Prasetyawan, Shengyu Wang, Hanqing Zhao, Takamichi Nakamoto</i>                                                                                            |     |
| Thin Film Reconfigurable Intelligent Surface Assisted Device-Free Fall Detection.....                                                                              | 286 |
| <i>Boxuan Xie, Yu Bai, Xinze Li, Lauri Mela, Tommi Rimpiläinen, Riku Jäntti</i>                                                                                    |     |
| Quadrature Compensation for a Frequency Modulated piezoMEMS Gyroscope .....                                                                                        | 290 |
| <i>Antti Ontronen, Masahiro Ishii, Chika Sakamoto, Seiji Umezawa, Yasuhiro Aida</i>                                                                                |     |
| MEMS Acetone Gas Sensors with Eu-doped SnO <sub>2</sub> /In <sub>2</sub> O <sub>3</sub> Nanofibers Using Electrospinning and Lithography Patterning Technique..... | 294 |
| <i>Tongheng Cheng, Jin Li, Gaoqiang Niu, Xitong Sun, Fei Wang</i>                                                                                                  |     |
| Measurement of DC Bias Current of Transformer Using Integrated TMR Sensors .....                                                                                   | 298 |
| <i>Xueqiong Zhu, Zhen Wang, Chengbo Hu, Zhengyu Liu, Jinggang Yang, Peng Fan, Zhen Wei</i>                                                                         |     |
| Composite and Stretchable Silicone for Niche Profiling Applications.....                                                                                           | 302 |
| <i>Padmanabh Pundrikaksha Pancham, Anupam Mukherjee, Teng-Chung Liu, Kun-Han Lin, Wen-Hsin Chiu, Chiang Liu, Cheng-Yao Lo</i>                                      |     |
| Highly Sensitive Biosensors for Chemicals of Alcohol Metabolism.....                                                                                               | 306 |
| <i>Kenta Iitani, Yuki Maeno, Geng Zhang, Kenta Ichikawa, Koji Toma, Takahiro Arakawa, Kohji Mitsubayashi</i>                                                       |     |
| Simulation and Validation of Automotive Radar Performance with Water Spray Over Radome .....                                                                       | 310 |
| <i>Diogo Wachtel, Thomas Rothmeier, Leticia Cristofoli, Martin Vossiek, Werner Huber</i>                                                                           |     |
| Temperature Dependence of Accuracy of Thermal Conductivity Hydrogen Sensor .....                                                                                   | 314 |
| <i>Shunsuke Akasaka, Koji Terumoto, Isaku Kanno</i>                                                                                                                |     |
| Speed-invariant Texture Discrimination using an Optical Tactile Sensor Array (LiVec Finger).....                                                                   | 318 |
| <i>Olivia Leslie, David Córdova Bulens, Stephen J. Redmond</i>                                                                                                     |     |

|                                                                                                                                                                        |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| An Ultra-Low Power System-on-Chip for IoT Sensing Nodes .....                                                                                                          | 322 |
| <i>Juan Luis Soler-Fernández, Omar Romera, Angel Dieguez, J. Daniel Prades, Oscar Alonso</i>                                                                           |     |
| Wireless Water Activity Monitoring System for Long-Term Biomass-Based Carbon Sequestration.....                                                                        | 326 |
| <i>Jacob N. Louie, Joshua Varughese, Deepti Gautam, Ahmad Mohammed, Natalie B. Kashoro, John M. Acken, David C. Burnett</i>                                            |     |
| Biocompatible, Dual-Purpose Electrochemical Aptamer Based Sensor for Real-Time Phenylalanine and pH Monitoring .....                                                   | 330 |
| <i>Yiling Yang, Xumei Gao, Bryce Widdicombe, Jana L Zielinski, Alastair G Stewart, Ranjith R Unnithan</i>                                                              |     |
| Incorporation of C-coated V <sub>2</sub> O <sub>5</sub> Nanoballs with TiO <sub>2</sub> Nanorod Arrays for Self-powered Electrochemical Broadband Photodetectors ..... | 334 |
| <i>Zexiang Luo, Hongyu Chen, Shanyu Liu, Xue Li, Lifeng Zhang, Haisheng San</i>                                                                                        |     |
| Using Triple Reverse-trapezoid Cantilevers and Unique Driving Method to Extend the Bandwidth of MEMS Microspeaker .....                                                | 338 |
| <i>Chin Tseng, Chia-Hao Lin, Po-Shen Chen, Tsung-Wen Tsai, Weileun Fang</i>                                                                                            |     |
| Plasmonic Micropillar Based SERS-Sensing Platform for Integrin Detection of Regulated Cells .....                                                                      | 342 |
| <i>Xiaoyu Wu, Ruoyu Feng, Feng Zhu, Zhaodong Zhang, Quanning Li, Xuejiao Chen, Yanyan Wang</i>                                                                         |     |
| Dual-Coupling Induced Singularities and Ultra-Sensitivity in Non-Hermitian Electromagnetic Systems.....                                                                | 346 |
| <i>Minye Yang, Baolong Jian, Zhilu Ye, Ming Liu</i>                                                                                                                    |     |
| IoT Based Smart Spectacles Integrated with Mobile App for Tech-Neck Posture Correction .....                                                                           | 350 |
| <i>Ankita Awasthi, Astha Rangare, Roshni Kaushik, Varad Shinde, Pugazhenthan Thangaraju, Jose Immanuel</i>                                                             |     |
| Research on the Metal 3D Printing Heat Exchanger for the Graphene Nanofluids.....                                                                                      | 354 |
| <i>Ya-Chi Ho, Tsai-Liang Wu, Da-Jeng Yao</i>                                                                                                                           |     |
| A Self-Biased Strontium Ferrite-Nickel Ferrite Compostite and PZT Bilayer for Magnetic Field Sensors .....                                                             | 358 |
| <i>Sujoy Saha, Sabita Acharya, Gopalan Srinivasan</i>                                                                                                                  |     |
| Vertical-Axis Rotary Triboelectric Nanogenerator with a Dual-Shaft Design for Enhanced Performance.....                                                                | 362 |
| <i>Jingu Jeong, Soonjae Pyo</i>                                                                                                                                        |     |
| Performance Enhancement of Piezoresistive Tactile Sensor Based on Mechanical Metamaterial with Negative Poisson's Ratio .....                                          | 366 |
| <i>Mingyu Kang, Honggap Choi, Keun Park, Soonjae Pyo</i>                                                                                                               |     |
| Analysis of Energy-Efficiency and Urban Coverage of Sony EL TRES LPWAN as an Emerging Technology in the UK IoT Network .....                                           | 370 |
| <i>Yogen Arlen Pramudita, Zheng Jun Chew</i>                                                                                                                           |     |
| A Novel System Design of Eddy Current Testing Robot for Metal Defect Detection.....                                                                                    | 374 |
| <i>Ruilin Lyu, Tian Meng, Xiong Lei, Fengkuan Zhu, Xue Bai, Wuliang Yin</i>                                                                                            |     |
| Pd Decorated SiO <sub>2</sub> -TiO <sub>2</sub> Nanocomposite for Low Temperature Hydrogen Sensing.....                                                                | 378 |
| <i>Thilini Thathsara, Christopher J. Harrison, Caiden J. Parker, Rosalie K. Hocking, Mahnaz Shafiei</i>                                                                |     |

|                                                                                                                                                                                      |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| High-Performance Microfluidic Chip Calorimeter for Biomedical Applications.....                                                                                                      | 382 |
| <i>Yi Chen, Bo Yan, Nan Zhao, Xiangxiang Gao, Chenyuan Li, Zhuoqing Yang, Congchun Zhang</i>                                                                                         |     |
| Improving Resolution of Translated Infrared Images.....                                                                                                                              | 386 |
| <i>Michiya Kibe, Takeru Inoue, Junya Morioka, Ryusuke Miyamoto</i>                                                                                                                   |     |
| Wireless, Fully soft, Pressure and Temperature Sensors for Sensitive and Robust Diabetic Foot<br>Ulcer Monitoring.....                                                               | 390 |
| <i>Xinran Li, Zhilu Ye, Minye Yang, Ming Liu, Xiaohui Zhang</i>                                                                                                                      |     |
| An Integrated Triple Sensing Electrode Design for Biochemical Applications.....                                                                                                      | 394 |
| <i>Yu-Quan Chen, Hung-Hsiang Wang, Chih-Ting Lin</i>                                                                                                                                 |     |
| High-Pressure Silicon Resonant Microsensor Based on Microbeam Arrays.....                                                                                                            | 398 |
| <i>Pengxiang Ye, Zongze Yu, Pan Qian, Deyong Chen, Junbo Wang, Bo Xie, Yulan Lu</i>                                                                                                  |     |
| Portable Chromatographic Analysis with Micro-Spectrometer for Real-Time Detection .....                                                                                              | 402 |
| <i>Po-Yen Hsieh, Ciao-Ming Tsai, Guan-Yi Lin, Weileun Fang, Cheng-Hao Ko</i>                                                                                                         |     |
| VelObPoints: a Neural Network for Vehicle Object Detection and Velocity Estimation for Scanning<br>LiDAR Sensors.....                                                                | 406 |
| <i>Lukas Haas, Nico Leuze, Arsalan Haider, Matthias Kuba, Thomas Zeh, Alfred Schöttl, Martin Jakobi, Alexander W. Koch</i>                                                           |     |
| A Planar Architecture with Polarity-Reversible Solenoid for High Power Density of MEMS<br>Vibration Energy Harvester .....                                                           | 410 |
| <i>K. Wang, X. J. Xiang, Zhang, D. Y. Zhang</i>                                                                                                                                      |     |
| All-sky Near-infrared Star Identification.....                                                                                                                                       | 414 |
| <i>Shunmei Dong, Qinglong Wang, Haiqing Wang, Qianqian Wang</i>                                                                                                                      |     |
| Design of Microfluidic Refractive Index Sensor Based on Phase Shift Grating .....                                                                                                    | 418 |
| <i>Pei Wang, Han Song, Zhikang He, Enlong Yao</i>                                                                                                                                    |     |
| Relative Measurement of Micro-UAVs Based on a Miniaturized 2D Profile Sensor System .....                                                                                            | 422 |
| <i>Chengsong Xiong, Wenshuai Lu, Chao Yao, Jiaqi Wan, Lingyun Zhang, Chi Zhang, Fei Xing, Zheng You</i>                                                                              |     |
| In-Line Portable Moisture Sensor.....                                                                                                                                                | 426 |
| <i>Diego Barrettino, Denis Ferreira, Markus Thalmann</i>                                                                                                                             |     |
| Impact of Al Content on the Photoresponse Characteristics of Ultrasonic Spray Pyrolytically<br>Deposited $(\text{Al}_x\text{Ga}_{1-x})_2\text{O}_3$ Solar-Blind Photodetectors ..... | 430 |
| <i>S.C. Shih, Z.Q. Hong, H.Y. Liu, W.C. Hsu</i>                                                                                                                                      |     |
| Ensemble Learning-Based Pork Freshness Classification with a Batteryless Sensor Tag.....                                                                                             | 434 |
| <i>Yudi April Nando, Ngoc-Dau Mail, Wan-Young Chung</i>                                                                                                                              |     |
| End-to-End Processing-on-Chip Wearable Ear EEG Device with Tiny Neural Network for<br>Multilevel Stress Detection .....                                                              | 438 |
| <i>Ngoc-Dau Mai, Yudi April Nando, Wan-Young Chung</i>                                                                                                                               |     |
| Development of Potassium Ion Sensor with Integrated Striped Gate Electrodes into Membrane for<br>Long-Term Soil Potassium Ion Monitoring.....                                        | 442 |
| <i>Islam Md. Muztahidul, Tatsunori Kamiya, Satoshi Tsuruta, Satoshi Ota, Satoshi Koike, Madoka Takai, Masato Futagawa</i>                                                            |     |

|                                                                                                                                                            |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Demonstration of Field Curvature Aberration Correction Using Curved CMOS Image Sensors .....                                                               | 446 |
| <i>Shigeyuki Imura, Masahide Goto, Hiroto Sato</i>                                                                                                         |     |
| Wearable Textile Sensor Using Hetero-Core Optical Fiber for Blood Pressure Measurement.....                                                                | 450 |
| <i>Ryouta Takayama, Michiko Nishiyama, Yuya Koyama</i>                                                                                                     |     |
| Single-Step Laser Fabrication of 3D Free-Standing Origami MEMS Thermal Sensor.....                                                                         | 454 |
| <i>Mohammad Nizar Mohamed Zukri, Muhammad Salman Al Farisi, Yoshihiro Hasegawa, Mitsuhiro Shikida</i>                                                      |     |
| Riding Skill Visualizing System for Motorcycle Using Multiple Zigbee Communication Line .....                                                              | 458 |
| <i>Fukushima Yukito, Izumi Daiki, Tomosada Masakazu, Kobuki Takeshi, Katayama Masaru</i>                                                                   |     |
| PDMS Micro-Patterning on Wafer Based on EtchBack Lift-Off for Microsystems Fabrication.....                                                                | 462 |
| <i>Xuchen Wang, Yukio Suzuki, Tatsuya Matsumoto, Toshiyuki Kikuta, Chung-Min Li, Shuji Tanaka</i>                                                          |     |
| EmoHEAL: A Fusion-Based Framework for Emotion Recognition Using Wearable Sensors.....                                                                      | 466 |
| <i>Omer Tariq, Yookyung Oh, Dongsoo Han</i>                                                                                                                |     |
| Dynamic Compensation of Quasi-Static Magnetic Field for Array Optically Pumped Magnetometers .....                                                         | 470 |
| <i>Niu Yaqiong, Cheng Longsheng, Chen Sitong, Wei Yutong, Ye Chaofeng</i>                                                                                  |     |
| Contactless Electrical Impedance Tomography with Deep Learning for Lung Monitoring: Phantom Study.....                                                     | 474 |
| <i>Yuxi Guo, Manuchehr Soleimani, Maomao Zhang</i>                                                                                                         |     |
| Sensor System for Water Stress Detection Using In-Plant Transmitted Signal Amplitude Evaluation .....                                                      | 478 |
| <i>Mattia Barezzi, Luca Rolle, Danilo Demarchi, Umberto Garlando</i>                                                                                       |     |
| Functionalized Graphene Sensors for Selective and Sensitive Gas Detection in Real air at Room Temperature.....                                             | 482 |
| <i>Manoharan Muruganathan, Osazuwa G. Agbonlahor, Md. Zahidul Islam, Afsal Kareekunnnan, Yosuke Onda, Masashi Hattori, Hiroshi Mizuta</i>                  |     |
| Defense Method Against Adversarial Example Attacks using Thermal Noise of a CMOS Image Sensor.....                                                         | 486 |
| <i>Yuki Rogi, Kota Yoshida, Tatsuya Oyamma, Takeshi Fujino, Shunsuke Okura</i>                                                                             |     |
| SPECTRE: A Dataset for Spectral Reconstruction on Chip-Size Spectrometers with a Physics-Informed Augmentation Method .....                                | 490 |
| <i>Julio Wissing, Teresa Scholz, Stefan Saloman, Lidia Fargueta, Stephan Junger, Alessio Stefani, Wladimir Tschekalinskij, Stephan Scheele, Ute Schmid</i> |     |
| Under Display Ambient Light Sensor for non-Invasive Vital Signs Monitoring.....                                                                            | 494 |
| <i>Nicola Picozzi, Alessandro Gumiero, Charlotte Milanetto, Ayoub Sabri</i>                                                                                |     |
| Ni <sub>3</sub> S <sub>2</sub> -HCSs Modified Polyaniline: Enhanced Ethanol Detection at Room Temperature.....                                             | 498 |
| <i>Clinton M. Masemola, Paul Fadojutimi, Manoko Maubane-Nkadimeng, Zikhona N. Tetana, Nosipho Moloto, Siziwe Gqoba, Ella C. Linganis</i>                   |     |
| Intrusion Detection of Accelerator Pedal Sensor Using a Scalable Data-Based Diagnostic Concept .....                                                       | 502 |
| <i>Andreas Schmitz, Felix Heimann, Marco Decker, Clemens Gühmann, Roland Serway</i>                                                                        |     |

|                                                                                                                                                                       |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Smart Cell with Internal Sensors to Limit Lithium Plating During Fast-Charge at Low Temperature .....                                                                 | 506 |
| <i>Romain Franchi, Sylvie Genies, Pierre Balfet, Cedric Debruyne, Yvan Reynier, Olivier Raccurt</i>                                                                   |     |
| Stabilized Adaptive Steering for 3D Sonar Microphone Arrays with IMU Sensor Fusion .....                                                                              | 510 |
| <i>Wouter Jansen, Dennis Laurijssen, Jan Steckel</i>                                                                                                                  |     |
| Single-Step 3D Printing of Flexible Ferroelectret Sensors with Large Air Cavities .....                                                                               | 514 |
| <i>Alexander A. Altmann, Sven Suppelt, Omar Ben Dali, Bastian Latsch, Dieter Spiehl, Sergey Zhukov, Felix Herbst, Jan Helge Dörsam, Andreas Blaeser, Mario Kupnik</i> |     |
| Biocompatible Artificial Skin with an Embedded Optical Fiber Specklegram Sensor.....                                                                                  | 518 |
| <i>Eric Fujiwara</i>                                                                                                                                                  |     |
| A Novel Phase Error Quantitative Characterization Method for Whole-Angle Micro Hemispherical Resonant Gyroscope.....                                                  | 522 |
| <i>Weiyu Chen, Anlan Ding, Xukai Ding, Hongsheng Li</i>                                                                                                               |     |
| Enhancing Maritime Situational Awareness through Monocular Vision .....                                                                                               | 526 |
| <i>Deran Maas, Bruno Arsenali, Jukka Peltola, Kalevi Tervo, Stefano Maranò</i>                                                                                        |     |
| In Situ Linker of Protein for the Immobilization on the Carbon-Based Sensor Materials.....                                                                            | 530 |
| <i>Jin Yoo, Tae Shin Park, Hwi Jin Ko, Myung Jin Kim, Tai Hyun Park</i>                                                                                               |     |
| Electric Field Micro Mill in the Nonlinear Regime with Enhanced Noise Density and Sensitivity.....                                                                    | 534 |
| <i>Lifang Ran, Guijie Wang, Shenglin Hou, Qianzhen Su, Jianhua Li, Bo Zhang, Xiaolong Wen, Najib Kacem, Ashwin A. Seshia</i>                                          |     |
| A Novel MEMS Sensor with a Floating Cover Plate for Wall-Shear Stress Measurement in the Harsh Supersonic Flow.....                                                   | 538 |
| <i>Yunzhe Liu, Lei Shi, Yunjian Chen, Shengming Ma, Kai Cheng, Chuqiao Wang, Xingxu Zhang, Jian Luo, Binghe Ma</i>                                                    |     |
| Lightweight Object Detection Model for a CMOS Image Sensor with Binary Feature Extraction.....                                                                        | 542 |
| <i>Keiichiro Kuroda, Yudai Morikaku, Yu Osuka, Ryoya Iegaki, Kota Yoshida, Shunsuke Okura</i>                                                                         |     |
| Preliminary Evaluation of Multi-Angle Spatial Compound Imaging with pMUTs.....                                                                                        | 546 |
| <i>Mantelena Sarafianou, Gaia Giubilei, David S. W. Choong, Duan J. Goh, Yul Koh, Alberto Leotti, Carla Lazzari, Jason Zhigang Jia, Domenico Giusti</i>               |     |
| Enhancing Port Automation: A Novel Object Detection Pipeline for Container Ship Bays.....                                                                             | 550 |
| <i>Junan Lin, Stefano Maranò, Bruno Arsenali, Josip Marjanovic, Niklas Sundholm, Elin Jirskog, Deran Maas</i>                                                         |     |
| Silk Fibroin-Based Flexible Bio-Piezoelectric Sensor for Nasal Flaring Monitoring .....                                                                               | 554 |
| <i>Qi Li, Yichu Zhang, Xuexin Duan, Qiannan Xue</i>                                                                                                                   |     |
| A Low-Cost RF Power Measurement System for Optimizing the Configuration of BLE Mesh Nodes.....                                                                        | 558 |
| <i>D. Perez-Diaz-de-Cerio, A. Valenzuela-Pérez, J.L. Valenzuela</i>                                                                                                   |     |
| A Fully Integrated E-nose System With 256 Half-Virtual Gas-Sensitive Pixels for Gas Recognition .....                                                                 | 562 |
| <i>Dongliang Chen, Dongcheng Xie, Qiuju Wu, Yujie Yang, Yan Zhang, Lei Xu</i>                                                                                         |     |
| A High-Performance Mode-Localized Vacuum Gauge Based on FPGA Closed-Loop Control.....                                                                                 | 566 |
| <i>Jiaxin Qin, Mengyang Zhou, Junbo Wang, Deyong Chen, Bo Xie, Yulan Lu, Nan Li, Zhaoyuan Tan, Jian Chen</i>                                                          |     |

|                                                                                                                                       |     |
|---------------------------------------------------------------------------------------------------------------------------------------|-----|
| Covalent Functionalization of Violet Phosphorus Nanosheets for Room-Temperature NO <sub>2</sub> Sensing.....                          | 570 |
| <i>Xue Liu, Weilin Chen, Chao Fan, Jian Wu, Jingzhu Li, Nantao Hu, Jianhua Yang, Min Zeng, Gang Liu, Zhi Yang</i>                     |     |
| A Simple Cascaded Fiber-Optic Fabry Perot Interferometer System with Vernier Effect for Sensitivity Enhanced Strain Measurements..... | 574 |
| <i>Dhyana C. Bharathan, R. Martijn Wagterveld, H.L. Offerhaus</i>                                                                     |     |
| Contactless In-Bed Detection Using a Low-Cost Low-Resolution Radar.....                                                               | 578 |
| <i>Hajar Abedi, Ahmad Ansariyan, George Shaker</i>                                                                                    |     |
| Impedance Flow Cytometer Tailored to the Real-Time Detection and Characterization of Microorganisms.....                              | 582 |
| <i>Mohadeseh Mozafari, Peer Erfle, Jonathan Block, Rainer Krull, Andreas Dietzel</i>                                                  |     |
| Visible Light-Induced Organic Artificial Synaptic Transistors Based on Protein-Ag Nanoparticle Composite.....                         | 586 |
| <i>Riya Sadhukhan, Asima Pradhan, Abhirup Das, Rajdeep Banerjee, Richeek Nayak, Madhuchanda Banerjee, Dipak Kumar Goswami</i>         |     |
| Moisture-Induced Energy Harvesting Devices with Biocompatible Albumin-MXene Composites.....                                           | 590 |
| <i>Abhirup Das, Riya Sadhukhan, Asima Pradhan, Priyanka Rani, Subharthi Saha, Madhuchanda Banerjee, Dipak Kumar Goswami</i>           |     |
| Self-Referencing MEMS Resonator with Dual Mechanical Modes for Temperature-Independent Environmental Sensing.....                     | 594 |
| <i>David D. Lynes, Hengky Chandralalim</i>                                                                                            |     |
| 3D Printing of Electrically Conductive Silver Nanoparticle-Embedded Foams for Pressure Sensor Applications.....                       | 598 |
| <i>Guanxing Kuang, Olivier Jérémie Nguon, Mohammad Mehrali, Johan Evert ten Elshof, Wilko Rohlf, Claas Willem Visser</i>              |     |
| Iron Detection Method Based on High-Resolution Magnetic Field Camera.....                                                             | 602 |
| <i>Hugo Nicolas, Céline Vergne, Joris Pascal</i>                                                                                      |     |
| Environmental Variation or Instrumental Drift? A Probabilistic Approach to Gas Sensor Drift Modeling and Evaluation .....             | 606 |
| <i>Cheng Yang, Gustav Bohlin, Tobias Oechtering</i>                                                                                   |     |
| Oxygen Plasma Treated RGO Based Resistive Sensor: A Step Towards NH <sub>3</sub> Detection from Human Breath .....                    | 610 |
| <i>Ambika Kumari, Srijeet Tripathy, Tarun Kanti Bhattacharyya</i>                                                                     |     |
| Wireless Readout System for Pressure Monitoring Using FFF-Printed Mold Fabricated Flexible Piezoresistive Sensors .....               | 614 |
| <i>Sai Peng, Arthur Camelbeke, Kevin Deschamps, Veerle Vandeginste, Hans Hallez</i>                                                   |     |
| Fast Crosstalk Compensation in Resistive Sensor Arrays Using Feed-Forward Neural Networks .....                                       | 618 |
| <i>S. Domínguez-Gimeno, R. Igual-Catalán, C. Medrano-Sánchez, I. Plaza-García</i>                                                     |     |
| Pheromone Receptor-Based Olfactory Sensors Using Resonant Diamond Membranes .....                                                     | 622 |
| <i>T. Nguyen, O. Zaki, N. Pavy, E. Scorsone, O. Francais, L. Rousseau, G. Lissorgues</i>                                              |     |
| Autonomous Continuous Methane Monitoring Sensor for Leak Detection in Oil and Gas Facilities.....                                     | 626 |
| <i>Mathieu Dauphin, Aditi Chakrabarti, Andrew Speck, Ballard Andrews</i>                                                              |     |

|                                                                                                                                                                     |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| A 1.25 $\mu\text{m}$ 59.3 Mpixel 60 fps CIS with 2×1 Multi-Directional Phase-Detection Pixels.....                                                                  | 630 |
| <i>Kodai Kikuchi, Kohei Tomioka, Takenobu Usui, Akira Honji, Hiroshi Shimamoto, Tomonari<br/>Kenzaki, Sota Hida, Takeo Ushinaga, Kenichi Nagai, Kazuya Kitamura</i> |     |
| Highly Sensitive Open-Cavity Fiber Mach-Zehnder Interferometer Sensor Based on Beveled No-<br>Core Fibers .....                                                     | 634 |
| <i>Hao-Chien Cheng, Chin-Ping Yu</i>                                                                                                                                |     |
| Development of Microfluidic Impedance Flow Cytometry Based on Three-Dimensional<br>Hydrodynamic Focusing .....                                                      | 638 |
| <i>Xiao Chen, Yimin Li, Mingruihong Wang, Xuzhen Qin, Junbo Wang, Xiaoye Huo, Jian Chen</i>                                                                         |     |
| Highly Sensitive, Multiplexed, and Accessible Digital Protein Measurement with MagDroplex .....                                                                     | 642 |
| <i>Jiumei Hu, Joseph Choy, Joon Soo Park, Pengfei Zhang, Hanran Lei, Bradley M. Downs,<br/>Hai-Quan Mao, Tza-Huei Wang</i>                                          |     |
| Multimodal Stress and Boredom Detection via Smartwatch Sensors and Hybrid Deep Residual<br>Network with CBAM .....                                                  | 646 |
| <i>Sakorn Mekruksavanich, Anuchit Jitpattanakul</i>                                                                                                                 |     |
| A Low Power Single-Cantilever Gas Sensor Cell with Remarkable Recognition Capability for Food<br>Freshness Related Gases.....                                       | 650 |
| <i>Yujie Yang, Dongcheng Xie, Yan Zhang, Dongliang Chen, Ruichen Liu, Di He, Cong Xing,<br/>Liang Geng, Lei Xu</i>                                                  |     |
| Self-Powered Component for High-G Sensing via Prestress Structured Triboelectric Transducer .....                                                                   | 654 |
| <i>Yuhan Wang, Yiqun Wang, Zhihao Zheng, Xiaofeng Wang, Keren Dai, Zheng You</i>                                                                                    |     |
| Noninvasive Glucose Estimation Using Multi-Wavelength Diffused Transmitted and Reflected<br>NIRS in Solid Tissue Phantoms.....                                      | 658 |
| <i>Jongdeog Kim, Mi-Ryong Park, Bong Kyu Kim</i>                                                                                                                    |     |
| A Conductivity-Compensated Liquid Film Thickness Measurement Scheme Using Segmented<br>Electrode Arrays .....                                                       | 662 |
| <i>Souvik Mandal, Prasanta Kumar Das, Karabi Biswas</i>                                                                                                             |     |
| Lemon Aids Green Synthesis of Reduced Graphene Oxide-Based FET Sensors for the Detection of<br>Lead and Cadmium Ions in Water .....                                 | 666 |
| <i>Nimisha, Monojit Mondal, Avik Sett, Virendra Kumar Tewari, Tarun Kanti Bhattacharyya</i>                                                                         |     |
| Electrochemical Biosensor Using Methylene Blue as an Electrochemical Mediator Coupling with<br>DNA Aptamer.....                                                     | 670 |
| <i>Koki Yamashita, Tomohiro Shimizu, Shoso Shingubara, Hitoshi Ishida, Akinori Kuzuya,<br/>Takeshi Ito</i>                                                          |     |
| In Situ Raman Multi-Gas Sensing During Formation and Residual Gas Impact on Cycling<br>Performance of Pouch Lithium-Ion Batteries.....                              | 674 |
| <i>Qilu Nie, Zhixiong Liu, Mengen Cheng, Shilong Pei, Dexun Yang, Cheng Cheng, Donglai<br/>Guo, Minghong Yang</i>                                                   |     |
| Doppler Radar-Based Recognition and Prediction of Cycling Behaviors .....                                                                                           | 678 |
| <i>Ryoya Hayashi, Kenshi Saho, Masao Masugi</i>                                                                                                                     |     |
| Single-Shot Efficient Depth Imaging Based on Time-Compressive CMOS Image Sensor.....                                                                                | 682 |
| <i>Michitaka Yoshida, Daisuke Hayashi, Lioe de Xing, Keita Yasutomi, Shoji Kawahito,<br/>Keiichiro Kagawa, Hajime Nagahara</i>                                      |     |

|                                                                                                                                                        |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Triaxial Force Plate with High Speed and Resolution Line Scan Camera for Sampling Moiré Method .....                                                   | 686 |
| <i>Yukitake Nakahara, Ohga Nomura, Hidetoshi Takahashi</i>                                                                                             |     |
| Evaluation of Automatic Irrigation System for Regulating Intrapelvic Pressure During Instrument Insertion and Removal for Flexible Ureteroscopy.....   | 690 |
| <i>Noriko Tsuruoka, Takashi Yoshida, Yoichi Haga, Hidefumi Kinoshita, Sang-Seok Lee, Tadao Matsunaga</i>                                               |     |
| An Individually Addressable Microneedle Array for Continuous Real-Time Monitoring of Glucose in Interstitial Fluid.....                                | 694 |
| <i>Wanying Chen, Yukun Ma, Zhen Dai, Shanshan Zhang, Yixin Zhao, Bo Liang</i>                                                                          |     |
| Cytotoxicity Anlysis of Drugs Using Contrast Surface Plasmon Images in Gold Nanoslit Arrays.....                                                       | 698 |
| <i>Hsien-San Hou, Ting-Jui Tu, Ji-Yen Cheng, Kuang-Li Lee, Pei-Kuen Wei</i>                                                                            |     |
| The Patchkeeper: An Integrated Wearable Electronic Stethoscope with Multiple Sensors .....                                                             | 702 |
| <i>Hongwei Li, Zoran Radivojevic, Maja Hedlund, Anton Fahlgren, Michael S. Eggleston</i>                                                               |     |
| Laws of Long-Term-Drift Performance for a Highly Sensitive MEMS Gravimeter Over 500 Days .....                                                         | 706 |
| <i>Lujia Yang, Shasha Liu, Xiaochao Xu, Fangzheng Li, Le Gao, Fangjing Hu, Wenjie Wu, Liangcheng Tu</i>                                                |     |
| Investigation of Hydrogen Spatial Distribution During Smoldering Fire in Capacitive MEMS Hydrogen Sensor Using Pt Thin Film .....                      | 710 |
| <i>Yumi Hayashi, Naoki Hiramatsu, Hiroshi Hamasaki, Hiroaki Yamazaki</i>                                                                               |     |
| Quantum Sensing of Phonons and Nuclear Spins in an Electromechanical Resonator .....                                                                   | 714 |
| <i>Yuma Okazaki</i>                                                                                                                                    |     |
| Real-Time Gas-Compensated Thermal Flow Sensor.....                                                                                                     | 718 |
| <i>Shirin Azadi Kenari, Remco J. Wiegerink, Remco G. P. Sanders, Joost C. Lötters</i>                                                                  |     |
| Low Noise Temperature Compensation Strategy for North-finding MEMS Gyroscope.....                                                                      | 722 |
| <i>Chongyang Ma, Jie Lin, Yang Zhao, Qin Shi, Guoming Xia, Anping Qiu, Jinyang Huang</i>                                                               |     |
| Optodevice-in-Sphere for Biaxial Tilt Sensing.....                                                                                                     | 726 |
| <i>Ruoyao Huang, Tingxuan Chen, Ling Zhu, Kwai Hei Li</i>                                                                                              |     |
| Characterization of Damping and Stiffness Mismatch on a Dual Foucault Pendulum Structure Manufactured in 30- $\mu$ m-Thick Epitaxial Polysilicon ..... | 730 |
| <i>Riccardo Nistri, Stefano Zoia, Davide Pavesi, Paolo Frigerio, Pietro Peliti, Valentina Zega, Gabriele Gattere, Giacomo Langfelder</i>               |     |
| FERT: Real-Time Facial Expression Recognition with Short-Range FMCW Radar .....                                                                        | 734 |
| <i>Sabri Mustafa Kaliya, Muhammet Sami Yavuz, Eckehard Steinbach</i>                                                                                   |     |
| Multi Time-Over-Threshold System for Light Signal in a Liquid Xenon 3-Photon Compton Camera.....                                                       | 738 |
| <i>Q. Lainé, N. Beaupere, D. Cai, C. Lahuec, E. Morteau, F. Seguin, D. Thers</i>                                                                       |     |
| Portable and Versatile Electronic Nose System Based on Edge Computing and Multi-task Model.....                                                        | 742 |
| <i>Wangze Ni, Tao Wang, Jiaqing Zhu, Zhuoheng Li, Lechen Chen, Weiwei Cheng, Haixia Mei, Fuzhen Xuan, Jianhua Yang, Min Zeng, Nantao Hu, Zhi Yang</i>  |     |
| DMGAN: Bridging AI and Chemistry with Enhanced GC-MS Data Generation .....                                                                             | 746 |
| <i>Namkyung Yoon, Hwangnam Kim</i>                                                                                                                     |     |

|                                                                                                                                                       |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Colorimetric/Electrical Sensing of Chemical Warfare Agent Surrogates with Polydiacetylenes .....                                                      | 750 |
| <i>Stephanie White, Philip Miller, Marieke Sorge, Clayton Curtis, Alexander Hare, Joshua Whiting, Jason Sammon, William C. Corbin</i>                 |     |
| Portable Intelligent Multi-Channel Electrochemical Analytical System with Self-Reconstruction Strategy and Edge Computing.....                        | 754 |
| <i>Zhuoheng Li, Hongyi Sun, Tao Wang, Wangze Ni, Jiaqing Zhu, Weiwei Cheng, Bowei Zhang, Fuzhen Xuan, Jianhua Yang, Min Zeng, Nantao Hu, Zhi Yang</i> |     |
| Fabrication of Conductive Nanomaterial Patterns on Polymeric Substrates Using Laser and Adhesive Tape .....                                           | 758 |
| <i>Mehraneh Tavakkoli Gilavan, Peter Kruse, P. Ravi Selvaganapathy</i>                                                                                |     |
| Potassium and Sodium Ion Concentration Sensors for Intracranial Monitoring Based on Solid-State Electrode.....                                        | 762 |
| <i>Tiezhu Liu, Yan Miao, Zixuan Song, Xuan Sun, Yuqi Luo, Chengyu Zhuang, Jun Zhou, Chunxiu Liu, Ning Xue</i>                                         |     |
| Resolution Upscaling of 3D Time-of-Flight Sensor by Fusion with RGB Camera.....                                                                       | 766 |
| <i>Yannick Waelti, Matthias Ludwig, Josquin Rosset, Teddy Loeliger</i>                                                                                |     |
| Microfluidic Platform for Real-Time Impedance Profiling of Transwell-Based Barrier Models.....                                                        | 770 |
| <i>Amber Bultena, Amanzhol Kurmashev, Julia A. Boos, Wei Wei, Mario M. Modena, Fernando Cardes, Andreas Hierlemann</i>                                |     |
| TMR Angle Sensor Calibration with 3D Misalignment Compensation .....                                                                                  | 774 |
| <i>Tim Samuel Winter, Martin Cornils, Laurent Osberger, Oliver Paul</i>                                                                               |     |
| Source Number Estimation Based on the Pressure and Particle Velocity Combined Processing for Acoustic Vector-Sensor Arrays.....                       | 778 |
| <i>Xianglu Li, Youyang Xiang, Zhijiang Huang, Qilong Du, Peng Fei, Dong Hou, Jie Tian</i>                                                             |     |
| Solving Relative Measurements on Finite Graphs .....                                                                                                  | 782 |
| <i>Titan Yuan, Kristofer S.J. Pister</i>                                                                                                              |     |
| Design and Test of MemS Resonant Pressure Sensor with A Novel Membrane Structure .....                                                                | 786 |
| <i>Zichao Zhang, Cun Li, Hong Xue, Le Hao, Kai Bu, Jiabin Ai, Yulong Zhao</i>                                                                         |     |
| Broadband MEMS Microphone Arrays with Reduced Aperture Through 3D-Printed Waveguides.....                                                             | 790 |
| <i>Dennis Laurijssen, Walter Daems, Jan Steckel</i>                                                                                                   |     |
| An Electrochemical Biosensor Enhanced by Surface Acoustic Waves for Point-of-Care Testing .....                                                       | 794 |
| <i>Li Wenjun, Han Liangya, Li Dachao, Pu Zhihua</i>                                                                                                   |     |
| AI-Driven rPPG Heart Rate Detection for In-Vehicle Monitoring .....                                                                                   | 798 |
| <i>Martina Pierri, Alessandro Gumiero, Nicola Picozzi</i>                                                                                             |     |
| A Mode-Localized DC Electric Field Microsensor with 0.4 V/ m Resolution.....                                                                          | 802 |
| <i>Pengfei Yang, Ruohang Wang, Zhaozhi Chu, Xiaolong Wen, Chunrong Peng</i>                                                                           |     |
| Highly Sensitive and Moisture-Resistant 3D DC Electric Field Meter Based on Microsensors .....                                                        | 806 |
| <i>Pengfei Yang, Xiaolong Wen, Zhaozhi Chu, Chunrong Peng</i>                                                                                         |     |
| Performance Evaluation of a Skin Conformable Polymer-based Flexible Temperature Sensor.....                                                           | 810 |
| <i>Athul Krishnan, Karthick Thiyagarajan, Mitradip Bhattacharjee, Yang An</i>                                                                         |     |

|                                                                                                                                                          |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| High-performance and Low-power VOCs Monitoring System with Temperature and UV Light Modulation Enhanced MEMS Gas Sensors .....                           | 814 |
| <i>Jiaqing Zhu, Tao Wang, Wangze Ni, Zhuoheng Li, Weiwei Cheng, Lechen Chen, Xinan Ma, Zhi Yang, Jianhua Yang, Shusheng Xu, Bowei Zhang, Fuzhen Xuan</i> |     |
| Environmentally-Aware Wireless Sensor Network Optimization for Improved Target Localization.....                                                         | 818 |
| <i>Joseph Mockler, Sarah Wielgosz, Huan Xu</i>                                                                                                           |     |
| Self-Driven Frequency Sensing Mechanism Based on Magnetoelectric Composites .....                                                                        | 822 |
| <i>Haomin Wu, Yikun Yang, Tian Xia, Bintang Yang</i>                                                                                                     |     |
| A Study of Low Power Infrared Sensor Using Ground Truth for Presence Detection Applications .....                                                        | 826 |
| <i>Syed Salman Rahman, Min Kyun Kim, Mauro Scandiuazzo, Yu Feng</i>                                                                                      |     |
| Analysis of Uptake and Release of Explosive Analyte from PDMS Films Using UV-vis Absorption Spectroscopy .....                                           | 830 |
| <i>Osheen Joseph, Paul Burn, Jos Kistemaker, Paul Shaw</i>                                                                                               |     |
| Sideslip Angle Estimation Based on a Kinematics Model Using An Unscented Kalman Filter.....                                                              | 834 |
| <i>Chi-Sheng Wu, Bo-Chiuan Chen</i>                                                                                                                      |     |
| Fall Risk Prediction for Elderly Using Head-Mounted Inertial Sensors and Tree-Based Models.....                                                          | 838 |
| <i>Yu-Zheng Chen, Fang-Yi Lin, Li-Fan Tseng, Chien-Hsu Chen, Pi-Shan Sung, Chih-Lung Lin</i>                                                             |     |
| Skin-Interfaced Wearable Biosensors.....                                                                                                                 | 842 |
| <i>Wei Gao</i>                                                                                                                                           |     |
| Exploration of Flavor Sample for Odor Reproduction In Mass Spectrum Space.....                                                                           | 844 |
| <i>Hanqing Zhao, Dani Prasetyawan, Takamichi Nakamoto</i>                                                                                                |     |
| Analysis of the Photothermal Parasitic Effect on an Optomechanical Antenna .....                                                                         | 848 |
| <i>Daniyal Khosh Maram, Xavier Cartoixá, Gabriel Abadal</i>                                                                                              |     |
| Fostering Sparsity in Sparse Convolution Networks for Efficient 3D Perception via Feature-Guidance.....                                                  | 852 |
| <i>Nico Leuze, Henry Schaub, Maximilian Hoh, Samed Doğan, Nicolas R.-Peña, Nikolas Voss, Alfred Schöttl</i>                                              |     |
| A Magnetofluidic Nucleic Acid Cartridge for Multiplexed Detection of Respiratory Pathogens .....                                                         | 856 |
| <i>Tianping Zhou, Nan Li, Xiaoye Huo, Deyong Chen, Junbo Wang</i>                                                                                        |     |
| An Underwater Multipath Channel Azimuth Estimation Method based on Sweep-Spread Carrier .....                                                            | 860 |
| <i>Hongjiang Chen, Zhipeng Li, Shaojian Yang, Xingbin Tu, Fengzhong Qu</i>                                                                               |     |
| Optimising the Fabrication of Reduced Graphene Oxide Electrodes by Laser Reduction .....                                                                 | 864 |
| <i>Thanaphon Surabunditthip, Neil Keegan, John Hedley</i>                                                                                                |     |
| Enhanced Magneto-Mechanical Coupling with FeGaB/AlN Thin Films in Mesoscopic Silicon-Free Coupled-Structure Magnetoelectric Resonators .....             | 868 |
| <i>Haoqi Lyu, Wuhao Yang, Yuxi Wang, Mingye Du, Zheng Wang, Xingyin Xiong, Tao Wu, Xudong Zou</i>                                                        |     |
| Energy-Efficient Implementation of Explainable Feature Extraction Algorithms for Smart Sensor Data Processing .....                                      | 872 |
| <i>Julian Schauer, Payman Goodarzi, Andreas Schütze, Tizian Schneider</i>                                                                                |     |

|                                                                                                                                                              |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Metal-Oxide-Semiconductor Nanostructured Sensors with P-N Heterojunctions on Metal Foil for Ionic Solution Detection.....                                    | 876 |
| <i>Yoshinari Kimura, Hironori Tohmyoh</i>                                                                                                                    |     |
| Graphene FET Biosensors with Surface-Charge Modulation.....                                                                                                  | 880 |
| <i>Shota Ushiba, Tomomi Nakano, Yuka Tokuda, Shinsuke Tani, Masahiko Kimura, Kazuhiko Matsumoto</i>                                                          |     |
| Enhancing Non-Invasive Electroanatomical Mapping with Dynamic Sensor Arrays .....                                                                            | 884 |
| <i>Erik Engelhardt, Johannes Hoffmann, Moritz Boueke, Norbert Frey, Gerhard Schmidt</i>                                                                      |     |
| Physically Accurate Lidar Simulation for Automotive Digital Twins .....                                                                                      | 888 |
| <i>Martin Dimitrievski, David Van Hamme, Wilfried Philips</i>                                                                                                |     |
| Flexible, Non-Invasive, and Wearable Fish Heart Rate Monitoring Tag for Guiding Aquaculture in Marine Ranching .....                                         | 892 |
| <i>Hai Zhang, Zihong Wei, Diye Wu, Zhuhan Dai, Danny Hughes, Tohru Sugahara, Shintaro Izumi, Yang Yang</i>                                                   |     |
| Onion Spoilage Detection Using PEDOT Coated Paper Based Sensor.....                                                                                          | 896 |
| <i>Satish Kumar, Snehanjan Acharyya, Debasmita Mondal, Shubhi Soni, Suparna Mukherji, Soumyo Mukherji</i>                                                    |     |
| Multispectral Imaging for Preliminary Burn Depth Evaluation in Mice with Tissue Section Analysis .....                                                       | 900 |
| <i>Yu-Hsien Lu, Meng-Hsuan Wu, Yu-Zheng Chen, Po- Liang Ou, Kuo-Shu Hung, Yi-Syuan Shin, Yuan-Yu Hsueh, Peng- Ting Chen, Chih-Lung Lin</i>                   |     |
| Electrostatic Resonant Accelerometer with Force-Rebalance Control.....                                                                                       | 904 |
| <i>Yoshiyuki Hata, Daiki Kondo, Haruki Kawano, Yugo Takeda</i>                                                                                               |     |
| A Normative Way to Implement ISO/IEC 23005 Between Olfactory Capturing and Displaying Device Applicable to Bio-Digital Convergence Technology.....           | 908 |
| <i>Hyung-Gi Byun</i>                                                                                                                                         |     |
| Facile and Scalable Fabrication of Micro-Dome Structure Array Based on Liquid Metal and its Application for High-Performance Flexible Pressure Sensors ..... | 912 |
| <i>Seong-Min Im, Min-gu Kim</i>                                                                                                                              |     |
| Microwave Filtering Sensor for Simultaneous Materials Characterization and Wireless Communication .....                                                      | 916 |
| <i>Zhuowei Zhang, Kam-Weng Tam, Gang Zhang, Chi-Hou Chio, Desen Li, Xin Zhou, Qiwei Chen, Junxiao Liu, Kong Ngai, Cheng Teng, Hon-Pan Sio</i>                |     |
| Sense-Based User Interface (SUI) Platforms to Detect Children's Physical and Emotional Behaviors.....                                                        | 920 |
| <i>Sangmin Lee, Jae-Hwan Jang, Young-Hwan Song, Byeong-sun Park, Yunhee Kim, Byungho Lee, Seok Lee, Yong-Jun Kim, Min-gu Kim</i>                             |     |
| System for Measuring Material Properties and Surface Roughness of Objects from Microscopic Images .....                                                      | 924 |
| <i>Kouji Murakami, Taishi Sakamoto</i>                                                                                                                       |     |
| The Impact of Outgassing of Molding Compound on Graphene for Gas Sensing .....                                                                               | 928 |
| <i>Tiance An, Mudassir Husain, Sten Vollebregt</i>                                                                                                           |     |
| Evaluation of Sensor Sets of Autonomous Vehicles Using Phenomenological Sensor Models .....                                                                  | 932 |
| <i>Philipp Hafemann, Thomas Blomeyer, Markus Lienkamp</i>                                                                                                    |     |

|                                                                                                                                                                                                                                                                                                                      |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Force Sensor for Versatile Single-Step Sensor Integration in 3D-Printed Parts .....                                                                                                                                                                                                                                  | 936 |
| <i>Felix Herbst, Esan Sundaralingam, Bastian Latsch, Sven Suppelt, Julian Seiler, Alexander Anton Altmann, Mario Kupnik</i>                                                                                                                                                                                          |     |
| Force Myography Sensors for Gait Phase Detection.....                                                                                                                                                                                                                                                                | 940 |
| <i>Bastian Latsch, Niklas Schäfer, Stephan Schaumann, Steffen Graffe, Asghar Mahmoudi, Martin Grimmer, Alexander A. Altmann, Omar Ben Dali, Julian Seiler, Stephan Rinderknecht, Philipp Beckerle, Mario Kupnik</i>                                                                                                  |     |
| Wearable Ballistocardiography for Unobtrusive Respiratory and Heart Rate Monitoring .....                                                                                                                                                                                                                            | 944 |
| <i>Bastian Latsch, Alexander A. Altmann, Omar Ben Dali, Romol Chadda, Niklas Schäfer, Kilian Schäfer, Muhammad Bilal Khan, Jan Helge Dörsam, Felix Herbst, Sven Suppelt, Oliver Gutfleisch, Mario Kupnik</i>                                                                                                         |     |
| MXene-based Planar Microwave Sensor for Acetone Gas Detection .....                                                                                                                                                                                                                                                  | 948 |
| <i>Jie Wei, Xiao-Cong Tang, Zhe-Yi Li, Qiang Wang, Cong Wang</i>                                                                                                                                                                                                                                                     |     |
| Experimental Analysis of Wind Effect in Acoustic Hail Sensors .....                                                                                                                                                                                                                                                  | 952 |
| <i>Florencia Blasina, Sebastián Pietra, Andrés Echarri, Nicolás Pérez</i>                                                                                                                                                                                                                                            |     |
| Hot Microtube Flowmetry with Heater-Integrated Microchannel Resonators .....                                                                                                                                                                                                                                         | 956 |
| <i>Juhee Ko, Jungchul Lee</i>                                                                                                                                                                                                                                                                                        |     |
| A Quantitative Microfluidic Flow Cytometer Based on Spaced Uniform Optical Fields .....                                                                                                                                                                                                                              | 960 |
| <i>Chiyuan Gao, Long Fan, Guang Yang, Junbo Wang, Xiaosu Zhao, Xiaoye Huo, Jian Chen</i>                                                                                                                                                                                                                             |     |
| Design and Development of Wearable Olfactory Interface for Locating Odor Source .....                                                                                                                                                                                                                                | 964 |
| <i>Shuo Li, Hanqing Zhao, Cong Yu, Ting Han</i>                                                                                                                                                                                                                                                                      |     |
| Towards a Portable Multi-Gas Sensor for Environmental Gases with Miniaturized Photoacoustic Cells and Mid-Infrared Quantum Cascade Lasers.....                                                                                                                                                                       | 968 |
| <i>Michaël Palmieri, Badhise Ben Bakir, Bertrand Boursin, Maeva Doron, Olivier Lartigue, Sonia Messaoudène, Adrien Poizat, Sarah Renault, Jules Skubich, Marion Volpert, Olivier Masson, Clément Garaffa, Julien Marianne, Eric Gautier, Séverine Moune, Edouard Régis, Philippe Labazuy, Christophe Constancias</i> |     |
| TSeizNet: Triplet Loss Empowered Multi-Scale CNN for Superior EEG Seizure Detection .....                                                                                                                                                                                                                            | 972 |
| <i>Wipamas Polpakdee, Phairot Autthasan, Theerawit Wilaiprasitporn</i>                                                                                                                                                                                                                                               |     |
| Multi-Modal EIT Imaging Using Lensfree and Flexible Impedance Sensor.....                                                                                                                                                                                                                                            | 976 |
| <i>Hao Fang, Ronald B. Liu, Jingyu Sun, Pierre O. Bagnaninchi, Zhe Liu, Yunjie Yang</i>                                                                                                                                                                                                                              |     |
| Utilizing Electropolymerized Polyaniline Films for Acetic Acid Detection: A Proof of Concept.....                                                                                                                                                                                                                    | 980 |
| <i>Akashlina Basu, Souvik Biswas, Soumen Das</i>                                                                                                                                                                                                                                                                     |     |
| Neuromorphic Touch Sensors for Pleasantness Encoding via Spike Patterns: A Bio-Inspired Artificial Fingertip for Restoring Affective Sensations .....                                                                                                                                                                | 984 |
| <i>Marian Statache, Mariangela Filosa, Sara Ballanti, Giacomo D'Alesio, Giulia Di Salvo, Domenico Camboni, Calogero Maria Oddo</i>                                                                                                                                                                                   |     |
| Analyzing and Overcoming Strain-Rate Dependence for Triboelectric Self-Powered Pressure Sensors .....                                                                                                                                                                                                                | 988 |
| <i>Vanessa Barton, Hridyesh Tewani, Vaibhav Khurana, Pavana Prabhakar, Joseph Andrews</i>                                                                                                                                                                                                                            |     |
| Efficient Colorimetric Membrane pH Sensor Based on Electrospun PCL/PVP Immobilized with Anthocyanin Extract for Intelligent Food Packaging .....                                                                                                                                                                     | 992 |
| <i>Shichen Li, Dhandayuthapani Thiyagarajan, Bong-Kee Lee</i>                                                                                                                                                                                                                                                        |     |

|                                                                                                                                                                                                                                       |      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Integrated Acoustic-Optic-Magnetic Sensing: Enabling Telemetry via Submarine Cables.....                                                                                                                                              | 996  |
| <i>Shaojian Yang, Yiran Wei, Xingbin Tu, Ke Jing, Yijin Xie, Tao Zhu, Mingjiu Zuo, Fengzhong Qu</i>                                                                                                                                   |      |
| Performance Enhancement of Piezoelectric MEMS Microspeaker by Jointed and Separated Curved Cantilever Array with Phase Modulation Circuit .....                                                                                       | 1000 |
| <i>Chia-Hao Lin, Chin Tseng, Tsung-Wen Tsai, Po-Shen Chen, Mei-Feng Lai, Weileun Fang</i>                                                                                                                                             |      |
| Quality Factor Engineering in NIR Optical Metasurfaces Using Ge <sub>2</sub> Sb <sub>2</sub> Te <sub>5</sub> and Graphene .....                                                                                                       | 1004 |
| <i>Seyed As'ad Amirhosseini, Daniyal Khosh Maram</i>                                                                                                                                                                                  |      |
| Optical Long Base Hydrostatic Tiltmeter for Slow Earthquake Detection.....                                                                                                                                                            | 1008 |
| <i>Han Cheng Seat, Michel Cattoen, Haris Apriyanto, Frédérick Boudin, Yasmine Nmili, Pascal Bernard, El-Madani Aissaoui, Alexandra Mavroeidi, Efthimios Sokos</i>                                                                     |      |
| Improved Selectivity of Impedimetric K <sup>+</sup> Sensors .....                                                                                                                                                                     | 1012 |
| <i>Eva-Maria Korek, Bajramshahe Shkodra, Antonio Altana, David Herbig, Paolo Lugli, Luisa Petti, Ralf Brederlow</i>                                                                                                                   |      |
| High-Risk Human Papillomavirus Detection: Towards Multiplex Point-of-Care Detection of HPV Using an Easy-to-use Device.....                                                                                                           | 1016 |
| <i>Jeanne E. van Dongen, Laura Folkertsma-Hendriks, Renske D.M. Steenbergen, Loes I. Segerink</i>                                                                                                                                     |      |
| Enhancing Sensitivity and Size Efficiency in CMOS Extended Gate FET Biosensors.....                                                                                                                                                   | 1020 |
| <i>Han-en Lee, Chun-Chen Wang, Michael S.-C. Lu</i>                                                                                                                                                                                   |      |
| Electrical Impedance Spectroscopy Platform for Label-Free Characterization of Spheroid Viability .....                                                                                                                                | 1024 |
| <i>Claudia Sampaio Da Silva, Julia Alicia Boos, Mario Modena, Sreedhar Kumar, Christian Beyer, Thomas Valentin, Andreas Hierlemann, Vincent Revol</i>                                                                                 |      |
| Microfluidic Sensor for Label-Free Corrosion and Biofilm Monitoring Using Electrical Impedance Spectroscopy .....                                                                                                                     | 1028 |
| <i>Song-I Han, Yuwen Li, Han Zhang, Arum Han</i>                                                                                                                                                                                      |      |
| Edge AI Algorithm for FBG-Based E-Skin Touch Localization on Embedded Electronics.....                                                                                                                                                | 1032 |
| <i>Elisabetta Leogrando, Francesco Dell'Olio, Stefano Mazzoleni, Calogero Maria Oddo, Mariangela Filosa</i>                                                                                                                           |      |
| Wave Dynamic Time Warping Algorithm for Periodic Signal Similarity Estimation .....                                                                                                                                                   | 1036 |
| <i>Evgenia Slivko, Gianfranco Mauro, Kay Bierzynski, Lorenzo Servadei, Robert Wille</i>                                                                                                                                               |      |
| Surface-Potential-Driven Sensing of Interfacial Configuration in Functionalized Suspended Graphene for Ionic Solutions.....                                                                                                           | 1040 |
| <i>Yu-Xuan Lu, Fang-Min Lin, Wei-Yu Long, Yu-Hsiu Lin, Chih-Ting Lin, Chi-Hsien Huang</i>                                                                                                                                             |      |
| Features Regression Analysis of CNT-FET NO <sub>2</sub> Sensor .....                                                                                                                                                                  | 1044 |
| <i>Cristina Gentili, Cosmin Roman, Christofer Hierold</i>                                                                                                                                                                             |      |
| Investigation of Environmental Influences on Radar Measurements in the W- and D-Band .....                                                                                                                                            | 1048 |
| <i>Tobias Körner, Jonas Wagner, Artur Chertkov, Jan Barowski, Ilona Rolfes, Christian Schulz</i>                                                                                                                                      |      |
| Smart Mattress Cover for Unobtrusive Monitoring of Sleep-Quality Correlates in Real-Life.....                                                                                                                                         | 1052 |
| <i>Carlotta Marinai, Lucia Arcarisi, Francesco Bossi, Pasquale Bufano, Francesco Di Rienzo, Eleonora Melissa, Gianluca Rho, Michele Zanoletti, Alberto Greco, Marco Laurino, Carlo Vallati, Nicola Carbonaro, Alessandro Tognetti</i> |      |

|                                                                                                                                         |      |
|-----------------------------------------------------------------------------------------------------------------------------------------|------|
| Robust Centroid and Apparent Diameter Extraction via Convex Optimization for Optical<br>Spacecraft Navigation .....                     | 1056 |
| <i>Natnael S. Zewge, Hyochoong Bang</i>                                                                                                 |      |
| Multi-Modal Sensor Fusion in Latent Embedding Space for Robust Autonomous Navigation .....                                              | 1060 |
| <i>Niels Balemans, Ali Anwar, Jan Steckel, Siegfried Mercelis</i>                                                                       |      |
| Reliable Setup for Contact Separation Mode Measurements of Triboelectric Materials and TENGs .....                                      | 1064 |
| <i>Björn Niklas Ewald, Uwe Pelz, Peter Woias</i>                                                                                        |      |
| Direct Estimation vs. Indirect Metrics: Machine Learning Techniques for Cardiac Output<br>Estimation.....                               | 1068 |
| <i>Vishal Singh Roha, Mehmet R. Yuce</i>                                                                                                |      |
| Battery-Powered Portable Multiplexed RT - PCR for HIV-1 and HIV-2 Viral Load Testing at<br>LIMIC.....                                   | 1072 |
| <i>Tianyi Liu, Anthony J. Politza, Md. Ahasan Ahamed, Aneesh Kshirsagar, Weihua Guan</i>                                                |      |
| Ex-Vivo Testing of Smart Ureteral Stent Toward Hydronephrosis Monitoring via Standard Stenting .....                                    | 1076 |
| <i>Mohammad Reza Yousefi Darestani, Dirk Lange, Ben H. Chew, Kenichi Takahata</i>                                                       |      |
| Evaluation of Patchable Inkjet-Printed Wearable Sensors for Measuring Muscle Activities .....                                           | 1080 |
| <i>Jihoon Lim, Huihui Zhang, Mingrui Sun, Han Lin, Baohua Jia, Jefferson Zhe Liu, Ying Tan</i>                                          |      |
| High Dynamic Range Object Detection System with Image Fusion Network Using High-<br>Illumination Specialized Binary Image .....         | 1084 |
| <i>Hyeong-Ung Byeon, Tae-Hoon Eom, Hyeon-June Kim</i>                                                                                   |      |
| Flexible Conducting Wire Based on Liquid Metal and Carbon Nanotubes.....                                                                | 1088 |
| <i>Lijie Kong, Weizhi Zhang, Ziyang Fan, Jiaqi Zhang, Keying Wu, Chentao Wang, Jianqiu Huang, Huiyang Yu</i>                            |      |
| On-chip Integration of Acoustic Streaming Tweezers and Coulter Counter for Simultaneously<br>Particles Focusing and Sensing .....       | 1092 |
| <i>Yongqi Chen, Ziyu Han, Wei Wei, Xuexin Duan</i>                                                                                      |      |
| Dual-Measurement Pitot Tube Type Airflow and Waterflow Speed Sensor for Seabird Biologging .....                                        | 1096 |
| <i>Kyota Shimada, Takuto Kishimoto, Hidetoshi Takahashi</i>                                                                             |      |
| Terahertz Quasi-MIM Absorber for Integrating with Thin-film MEMS Bolometers .....                                                       | 1100 |
| <i>Zihao Zhao, Kazuho Harada, Chao Li, Isao Morohashi, Ya Zhang</i>                                                                     |      |
| Advanced Integration of 3D Optomechanical Sensor Microsystems with Optical Fibers .....                                                 | 1104 |
| <i>Hengky Chandralalim, Jeremiah C. Williams</i>                                                                                        |      |
| Integration of EMG Electrodes by Disruptive 3D Printing Into a Mandibular Brace .....                                                   | 1108 |
| <i>Maximilian L. Amberg, Sven Suppelt, Alexander A. Altmann, Florian G. Freidinger, Felix Herbst, Bastian Latsch, Mario Kupnik</i>      |      |
| Proof of Principle: Full 6D Point-to-Point Motion Tracking with Magnetoelectric Sensors.....                                            | 1112 |
| <i>Johannes Hoffmann, Moritz Boueke, Erik Engelhardt, Tobias Schmidt, Clint Hansen, Julius Welzel, Walter Maetzler, Gerhard Schmidt</i> |      |
| Banana Ripeness Estimation Using a Non-Destructive Approach Composed of an Array of<br>Multimodal Sensors and Machine Learning.....     | 1116 |
| <i>Kristian M. S. Callaghan, Uriel Martinez-Hernandez</i>                                                                               |      |

|                                                                                                                                              |      |
|----------------------------------------------------------------------------------------------------------------------------------------------|------|
| Real-Time Monitoring of CaCO <sub>3</sub> Precipitation Using Fiber Optics Scale Sensor Under High Temperature and Pressure Conditions ..... | 1120 |
| <i>Sakurako Satake, Ai Hosoki, Takuya Okazaki, Akira Ueda, Hideki Kuramitz, Amane Terai</i>                                                  |      |
| Effects of Acoustic Leakage on MEMS Directional Microphones.....                                                                             | 1124 |
| <i>Jie Li, Mingchao Sun, Boyun Zhang, Bohua Liu, Chongling Sun, Wei Pang, Menglun Zhang</i>                                                  |      |
| Enhancing Bioimpedance Tissue Classification with Elastography Sensor Data via Multimodal Learning .....                                     | 1128 |
| <i>Matthias Ege, Emily Hellwich, Franziska Krauß, Zoltan Lovasz, Johannes Schüle, Carina Veil, Oliver Sawodny, Cristina Tarin</i>            |      |
| Transmit Beamforming for Phased Array Radars Under Uncertain Occupancy Grid Map Information .....                                            | 1132 |
| <i>Edoardo Focante, Nitin Jonathan Myers, Geethu Joseph, Ashish Pandharipande</i>                                                            |      |
| Directionally Sensitive Active Helmholtz Resonator Metamaterials Enabled Through 3D-Printing .....                                           | 1136 |
| <i>Roger Domingo-Roca, Andrew Feeney, James F. C. Windmill, Joseph C Jackson-Camargo</i>                                                     |      |
| Reference-Free Multi-Species Gas Detection via Unsupervised Learning.....                                                                    | 1140 |
| <i>Mohamed Sy, Emad Al Ibrahim, Ali Elkhazraji, Aamir Farooq</i>                                                                             |      |
| Verilog-A Modelling of Electrochemical Sensors for Combined Simulation of Biosensors and Interfaces .....                                    | 1144 |
| <i>Aakash Jog, Ankit Gupta, Ariel Shapira, Yizhak Shifman, Pinchas Tandeitnik, Joseph Shor, Yosi Shacham-Diamand</i>                         |      |
| A Low Speed Sampling Method Applicable to IoT Data Analysis.....                                                                             | 1148 |
| <i>Yumeto Oda, Toshihiro Okajima, Yukihiro Kamiya</i>                                                                                        |      |
| A Microfluidic Platform Based on Magnetic Labels for Rapid Mixing, Trapping and Detection of Biomarkers .....                                | 1152 |
| <i>Bo Bao, Xinran Tian, Ridong Wang, Dachao Li</i>                                                                                           |      |
| Wirelessly Powered Buried Soil Moisture Sensor System .....                                                                                  | 1156 |
| <i>Vernon S. Crasto, William R Eisenstadt, David P. Arnold</i>                                                                               |      |
| Synthetic Electrochemical Biosensor Data with Conditional Variational Autoencoders for Enhanced Predictive Modeling .....                    | 1160 |
| <i>Desmond Kai Xiang Teo, Tomas Maul, Michelle Tien Tien Tan</i>                                                                             |      |
| Three-Dimensional Shape Optimized Seesaw-Type Force Sensor Fabricated with a Micro-Scale 3D Printer.....                                     | 1164 |
| <i>Soya Sato, Yukitake Nakahara, Gakuto Kagawa, Makoto Asai, Hidetoshi Takahashi</i>                                                         |      |
| Shape Sensing Stretchable Sensor Grid Towards Camera-Less Motion Capture .....                                                               | 1168 |
| <i>Joseph Karam, Aiden Shaevitz, Joseph R. Davidson, Matthew L. Johnston</i>                                                                 |      |
| Digital Model-Based Approach for Predicting Gearbox Remaining Useful Life Using Response Surface Methodology .....                           | 1172 |
| <i>Li-Te Huang, Jen-Yuan Chang</i>                                                                                                           |      |
| Non-Invasive Real-Time Monitoring of Blood Lactate Using a Low-Power Microwave Sensor .....                                                  | 1176 |
| <i>Alex Mason, Olga Korostynska, Jon Dixon, Rob Connell</i>                                                                                  |      |

|                                                                                                                                   |      |
|-----------------------------------------------------------------------------------------------------------------------------------|------|
| A Practical Analysis of Persuasive and Dark Patterns for IIoT and Industrial Cyber-Physical Systems.....                          | 1180 |
| <i>Diego Ramil-López, Paula Fraga-Lamas, Tiago M. Fernández-Caramés</i>                                                           |      |
| Evaluation of Background Odor Influence on Mold Odor Detection Using Multiple Insect Olfactory Receptor-Based Sensor Arrays ..... | 1184 |
| <i>Yuji Sukekawa, Rui Zhou, Sawako Niki, Eri Kuroda, Ryohei Kanzaki, Hidefumi Mitsuno</i>                                         |      |
| Node Selection for Asynchronous Multi-Target Tracking in Heterogeneous Sensor Networks.....                                       | 1188 |
| <i>Zishi Zhang, Ye Yuan, Lei Zhu, Jing He, Wei Yi</i>                                                                             |      |
| Toward Large-scale Application of a Bio-Inspired MEMS Optical Hair Flow Sensor Array .....                                        | 1192 |
| <i>Lansheng Zhang, Zheyi Hang, Huan Hu</i>                                                                                        |      |
| Graphene/Silver-fused Nanocomposites for Strain Sensing Applications.....                                                         | 1196 |
| <i>Aniket Chakraborty, H. Harija, Suresh Nuthalapati, Anindya Nag, Memet Ercan Altinsoy</i>                                       |      |
| Compact GaN-based Optical Force Sensors with Hemispherical Reflectors .....                                                       | 1200 |
| <i>Yumeng Luo, Yuqi Liu, Jiahao Yin, Hongyu Yu, Kwai Hei Li</i>                                                                   |      |
| A Multi-Segment Ferromagnetic-Core Enhanced Stretchable Strain Sensor .....                                                       | 1204 |
| <i>Zhengyan Wang, Yufeng Wang, Xinxin Chang, Houping Wu, Hongbo Wang</i>                                                          |      |
| Electromagnetic Vibration Energy Harvester with Replaceable Ortho-planar Springs .....                                            | 1208 |
| <i>Tra Nguyen Phan, Ye Xu, Bengt Oelmann, Sebastian Bader</i>                                                                     |      |
| A Low-Power Low-Complexity Circuit for Event-Based Feature Extraction from sEMG.....                                              | 1212 |
| <i>Andrea Prestia, Andrea Mongardi, Danilo Demarchi, Fabio Rossi, Paolo Motto Ros</i>                                             |      |
| Critical Buckling Voltage Shift-Based Resonant Vacuum Pressure Micro-Sensor.....                                                  | 1216 |
| <i>Nouha Alcheikh</i>                                                                                                             |      |
| Ultra-Sensitive Differential Sensor for Liquid Dielectric Characterization Using 1-Bit Coding in DGS.....                         | 1220 |
| <i>Cong Wang, Jie Weil, Zhe-Yi Li, Xiao-Cong Tang, Jiao-Yang Li, Yang Yi</i>                                                      |      |
| Wearable Temperature Sensing Bandages Based on Fano Resonance .....                                                               | 1224 |
| <i>Xi-Fan Gao, Zi-Ang Qi, Qing-An Huang, Lei Dong</i>                                                                             |      |
| Passive Acoustic Temperature Sensor Characterization with Animal Tissue .....                                                     | 1228 |
| <i>Lucrezia Maini, Roman Furrer, Christofer Hierold, Cosmin Roman</i>                                                             |      |
| Event-Based Real-Time Fall Detection Using YOLOv8 and LSTM.....                                                                   | 1232 |
| <i>Weihao Liang, Yongsheng Ma</i>                                                                                                 |      |
| Sensing-Oriented ISAC with OTFS: Effective IRCI-free Target Range Reconstruction .....                                            | 1236 |
| <i>Xinyu Liu, Ye Yuan, Zhengquan Zhang, Zheng Ma, Pingzhi Fan</i>                                                                 |      |
| Modeling and Optimization of Multi-terraced-Plate Electrostatic Actuator.....                                                     | 1240 |
| <i>Biyun Ling, Minli Cai, Biqing Zhou, Xiaoyue Wang, Yuhu Xia, Yuwei Han, Yaming Wu</i>                                           |      |
| A Wearable ECG System with Printed Electrodes for Heart Health Monitoring and Diagnosis.....                                      | 1244 |
| <i>Sakandar Rauf, Rana Muhammad Bilal, Mohammad Vaseem, Atif Shamim</i>                                                           |      |
| SensOL: Memory-Efficient Online Learning for Tiny MCUs.....                                                                       | 1248 |
| <i>Lokmane Demagh, Patrick Garda, Cedric Gilbert, Khalil Hachicha</i>                                                             |      |

|                                                                                                                                                               |      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Detection of Out-of-Plane Waviness in Carbon-Fibre Reinforced Plastics - Comparing different Non-Destructive Evaluation Modalities .....                      | 1252 |
| <i>Rylan Gomes, Ehsan Mohseni, S.G. Pierce, Kenneth Burnham, Amine Hifi, Charles N Macleod, Vincent Maes, Matthew Chandler, Andy Barnes, Gavin Munro</i>      |      |
| Monocular Camera and IMU Integration for Pedestrian Trajectory Prediction .....                                                                               | 1256 |
| <i>Yu-Jou Chen, Chui-Hong Chiu, Yu-Chen Lin, Pao-Kai Wang</i>                                                                                                 |      |
| Self-Heating SnO <sub>2</sub> Gas Sensors for Low-Power Intelligent Olfactory Diagnosis .....                                                                 | 1260 |
| <i>Xuesi Li, Feng Lin, Shin'ichi Warisawa</i>                                                                                                                 |      |
| Advancing Fetal Surveillance with Physiological Sensing: Detecting Hypoxia in Fetal Sheep.....                                                                | 1264 |
| <i>Weitao Tang, Nhi Tran, Nasim Katebi, Reza Sameni, Gari D. Clifford, David Walker, Vaishnavi Horlali, Callum Taylor, Robert Galinsky, Faezeh Marzbanrad</i> |      |
| ME-Net: A Network for Scale-Variant Objects in Harsh Underwater Detection Scenes.....                                                                         | 1268 |
| <i>Haodi Zhu, Shaojian Yang, Yan Wei, Wenchu Wang, Xinyi Zhou, Fengzhong Qu</i>                                                                               |      |
| LIF-SAR: Local Interpolation Function based SAR Imaging for Irregular Scanning Geometries.....                                                                | 1272 |
| <i>Andrew Gigie, R Krishna Kanth, A Anil Kumar, Tapas Chakravarty, Arpan Pal</i>                                                                              |      |
| A MXene@Pt Nanocomposite-based Wearable Epidermal Patch for Real-time Glucose and pH Monitoring.....                                                          | 1276 |
| <i>Ye Young Lee, Md Asaduzzaman, Ahmad Abdus Samad, Jae Yeong Park</i>                                                                                        |      |
| Frequency Measurement Using Frequency Control to Improve Distance Resolution of FMCW LiDAR.....                                                               | 1280 |
| <i>Jubong Lee, Youngjoon Cho, Kyihwan Park</i>                                                                                                                |      |
| High Quality Factor Surface Acoustic Wave Temperature Sensor with Impedance Adjustment.....                                                                   | 1284 |
| <i>Kai Cheng, Guangyao Pei, Yunzhe Liu, Jianing Zhang, Chuqiao Wang, Xingxu Zhang, Binghe Ma, Jian Luo</i>                                                    |      |
| A Respiratory Disease Diagnosis Method of Electronic Nose Based on Pyramid Pooling and Self-Attention Mechanism .....                                         | 1288 |
| <i>Jingyi Peng, Haixia Mei, Tao Wang, Min Zeng, Dongdong Xu, Xiaoxue Xing, Lijuan Shi, Keyu Meng, Hongwu Qin, Jian Zhao, Bowei Zhang, Fuzhen Xuan</i>         |      |
| Identification of Varieties of Agricultural Products Based on a Machine Olfactory System and a Lightweight Multiscale Convolutional Neural Network .....      | 1292 |
| <i>Jia Yan, Zhe Li, Mingye Han, Yong Chen, Songqi Gao, Shuangjing Yang</i>                                                                                    |      |
| Design of an IoT Virtual Reality-Based Wearable Multi-Sensory System for Venous Thromboembolism Prevention Through Exercises .....                            | 1296 |
| <i>Yongfu Wang, Boon Giin Lee, Hualian Pei, Xiaoqing Chai</i>                                                                                                 |      |
| A Perceptive Soft Finger for Shape and Texture Recognition .....                                                                                              | 1300 |
| <i>Tonglin Li, Yufeng Wang, Yingao Xu, Jiayuan Zhang, Hongbo Wang</i>                                                                                         |      |
| A Miniature Self-Decoupled Multiaxis Force Sensor via 3D Orthogonal Configuration.....                                                                        | 1304 |
| <i>Yingao Xu, Xinxin Chang, Jiayuan Zhang, Yueyang Wang, Hongbo Wang</i>                                                                                      |      |
| Mode Localized Piezoelectric Resonator Design and Implementation for Electrical Current Sensing.....                                                          | 1308 |
| <i>Yu-Chi Hung, Ken-Wei Tang, Sheng-Shian Li</i>                                                                                                              |      |

|                                                                                                                                                                                                 |      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Humidity Detection Based on Inorganic Topological Insulator Bi <sub>2</sub> Se <sub>3</sub> -Organic PEO Composite Film .....                                                                   | 1312 |
| <i>Mengqing Wang, Yongcai Guoa, Xiaogang Lina, Lei Xiea, Cheng Zouc, Hongping Liang, Yong Zhou</i>                                                                                              |      |
| Ultra Miniaturized Absolute Rotary Encoder Integrated into Hinge Joint .....                                                                                                                    | 1316 |
| <i>Massimiliano Filipozzi, Céline Vergne, Georg Rauter, Philippe C. Cattin</i>                                                                                                                  |      |
| Significantly Improved Front Side Illuminated Photodiodes: Integrated in a 0.18 µm Modular CMOS Foundry Technology.....                                                                         | 1320 |
| <i>Daniel Gabler, Pablo F. Siles, Ai Qiang</i>                                                                                                                                                  |      |
| Enhancing Ozone Gas Sensor Performance with Polypyrrole-Coated Metal-Oxide Semiconductors .....                                                                                                 | 1324 |
| <i>Chiu-Hsien Wu, Wan-Yu Lin, Utkarsh Kumar, Zu-Yin Deng, Kuang Yao Lo, Kuen-Lin Chen</i>                                                                                                       |      |
| Monolithic Vacuum Packaging for a CMOS MEMS Resonator Oscillator.....                                                                                                                           | 1328 |
| <i>C. Y. Chang, C. T. Hsin, Y. Z. Juang, S. H. Tseng</i>                                                                                                                                        |      |
| Integrating LSPR and SERS for Rapid and Effective Visualization and Identification of Volatile Organic Compounds Distribution.....                                                              | 1332 |
| <i>Cong Wang, Kumazoe Shingo, Hao Guo, Yao Wang, Fumihiko Sassa, Hayashi Kenshi</i>                                                                                                             |      |
| Inkjet-printed Electrohydraulic Actuator .....                                                                                                                                                  | 1336 |
| <i>Chinmay Gupta, Wessel Hogenboom, Bayu Jayawardhana, Ajay Giri Prakash Kottapalli</i>                                                                                                         |      |
| Architecture and Doping Optimization For FSI SPAD In 55nm BCD Lite® Process .....                                                                                                               | 1340 |
| <i>Ping Zheng, Francesco Gramuglia, Yongshun Sun, Yew Tuck Chow, Yongchau Ng, Deepthi Kandasamy, Li Fei Tan, Sally Chwa, Vinit Dhulla, Jan Hoentschel, Eng Huat Toh</i>                         |      |
| Toward Automatic Cardiovascular and Respiratory Assessment Using Automatic 6-Minute Walking Test .....                                                                                          | 1344 |
| <i>Katri Karhinoja, Tuukka Panula, Matti Kaisti</i>                                                                                                                                             |      |
| Development of Microfluidic Platform for Refractive Index Measurement of Liquid.....                                                                                                            | 1348 |
| <i>Taeyeong Kim, Minwoo Choi, Bong Jae Lee, Jungchul Lee</i>                                                                                                                                    |      |
| ResSense: A Modern Pipeline for Respiratory Arousal Detection Using PPG Signals .....                                                                                                           | 1352 |
| <i>Nattawat Soontreekulpong, Phairot Autthasan, Thitikorn Kaewlee, Wansiri Worawitayanon, Tanut Choksatchawathi, Nattapong Jaimchariyatam, Busarakum Chaitusaney, Theerawit Wilaiprasitporn</i> |      |
| Smooth Speed Control for an Autonomous Vehicle and On-Road Verification .....                                                                                                                   | 1356 |
| <i>Hui-Wen You, Mao-Jen Ko, Yu-Chen Lin, Jia-Yi Zhao, Yu-Jou Chen</i>                                                                                                                           |      |
| Electrochemical Sensing of the Colorectal Cancer BRAF p.V600E Mutation Using a Lab-on-Chip Integrated DNA Amplification Analysis Method .....                                                   | 1360 |
| <i>Calista Adele Yapeter, Katerina-Theresa Mantikas, Costanza Gulli, Nicolas Moser, Constantinos Simillis, Melpomeni Kalofonou, Pantelis Georgiou</i>                                           |      |
| A Phonocardiogram Quality Assessment Method Using Multi-Domain Feature .....                                                                                                                    | 1364 |
| <i>Li Ling, Yumin Li, Yuchan Lv, Xinru Qin, Yamei Bai, Chenxi Yang, Junjie Pan, Huan Li, Chenghao Sui, Yanan Zhou, Jianqing Li, Chengyu Liu</i>                                                 |      |
| Lateral Compression Enhanced Single-cell Microfluidic Cytometer for Tumor Cell Detection.....                                                                                                   | 1368 |
| <i>Yiming Liu, Shuaihua Zhang, Ziyu Han, Xuexin Duan</i>                                                                                                                                        |      |

|                                                                                                                                                      |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Polymer-Free Batch Production and Application of Metal Foil-Based Thin-Film Strain Gauges.....                                                       | 1372 |
| <i>Rico Ottermann, Eileen Müller, Marvin Keßler, Folke Dencker, Daniel Klaas, Marc Christopher Wurz</i>                                              |      |
| Deep-N-Well-Assisted CMOS Photovoltaic Micro-Cells for Powering the Wearable Sensors .....                                                           | 1376 |
| <i>Roghaieh Parvizi, Fiheon Imroze, Jinwei Zhao, Martin Weides, Muhammad Ali Imran, Hadi Heidari</i>                                                 |      |
| An Efficient Wrist Photoplethysmogram Quality Assessment Method Based on Wristwatches.....                                                           | 1381 |
| <i>Yumin Li, Li Ling, Chao Chen, Zhijun Xiao, Chenxi Yang, Junjie Pan, Chaohong Liu, Huan Li, Yanan Zhou, Chenghao Sui, Jianqing Li, Chengyu Liu</i> |      |
| High-Q Surface Acoustic Wave Humidity Sensors Based on Tunable Fano Resonance.....                                                                   | 1385 |
| <i>Mengting Wang, Jianqiu Huang, Qing-An Huang</i>                                                                                                   |      |
| Nanozyme-Assisted Quantitative Estimation of Cholesterol Using Ultrathin Silver Nanosheet .....                                                      | 1389 |
| <i>Pratyusa Mohapatra, Thuria Hasan, Soumen Das</i>                                                                                                  |      |
| Optimal Design of Differential Sensor Array for Interference Elimination of Noninvasive Multicore<br>Cable Current Measurement.....                  | 1393 |
| <i>Qi Zhu, Guangchao Geng, Quanyuan Jiang</i>                                                                                                        |      |
| Grating-coupled silver nanoparticle arrays for point-of-care PCR platform .....                                                                      | 1394 |
| <i>Eunjeong Byun, Seung Hyun Song</i>                                                                                                                |      |
| Modular Wireless Inertial Motion Capture System with Self-Calibration.....                                                                           | 1398 |
| <i>Niklas Schäfer, Bastian Latsch, Julian Seiler, Lukas Hugo Hammen, Lars Stein, Felix Herbst, Philipp Beckerle, Mario Kupnik</i>                    |      |
| Development of a 2–4 Double Arbiter PUF Design on FPGA with Enhanced Performance .....                                                               | 1402 |
| <i>Sinan Yavuz, Edwin Naroska, Kai Daniel</i>                                                                                                        |      |
| Decoding Brain Age: A Self-Supervised Graph Neural Network Framework for EEG Analysis .....                                                          | 1406 |
| <i>Zara Cook, Chengzong Zhao, Livia Murray, Jivan Kesan, Nabil Belacel, Sam M. Doesburg, George Medvedev, Vasily A. Vakorin, Pengcheng Xi</i>        |      |
| Deep Learning-Enhanced EMG Armband with an Interactive Game for Effective Wrist<br>Rehabilitation .....                                              | 1410 |
| <i>Truong-Tien Vo, Ngoc-Dau Mai, Jaeyeop Choi, Junghwan Oh</i>                                                                                       |      |
| A Green and Facile Approach of Graphite Conductive Ink Preparation for Electrochemical Sensing<br>Application .....                                  | 1414 |
| <i>Smriti Sinha, Soumen Das</i>                                                                                                                      |      |
| Paper-Based PEDOT:PSS Sensors for Cure Process Monitoring of Epoxy Resin .....                                                                       | 1418 |
| <i>Sarah Bornemann, Yicheng Zhou, Reiner Jedermann, Björn Lüssem</i>                                                                                 |      |
| Loaded Re-Entrant Cavity Microwave Sensor for Dielectric Constant Measurement .....                                                                  | 1422 |
| <i>Tsung-Yu Li, Chin-Lung Yang</i>                                                                                                                   |      |
| A Wearable EEG Band Based on Spray-Coated Textile Bioelectrodes .....                                                                                | 1426 |
| <i>Fabrizio Antonio Viola, Andrea Spanu, Antonio Dominguez Alfaro, Miryam Criado-Gonzalez, David Mecerreyes, Annalisa Bonfiglio</i>                  |      |
| Understanding Electrostatic Sensing with Graphene: A Miniature and Versatile Alternative to<br>Standard Technologies.....                            | 1430 |
| <i>Jules Maistret, Pierre Lavenus</i>                                                                                                                |      |

|                                                                                                                                                                                                                                         |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| A New Frontier in CO <sub>2</sub> Sensing: A Comparative Study of Thermal and Light Activation in Na:In <sub>2</sub> O <sub>3</sub> Nanostructured Materials.....                                                                       | 1434 |
| <i>Arianna Rossi, Barbara Fabbri, Andrea Gaiardo, Matteo Ferroni, Gabriele Vola, Matteo Ardit, Vincenzo Guidi</i>                                                                                                                       |      |
| Reflectometry Architecture for Enhanced Fault Localization Based on Low PAPR Chirp-OMTDR .....                                                                                                                                          | 1438 |
| <i>Yosra Gargouri, Mariem Slimani, Nicolas Ravot, Mickael Cartron</i>                                                                                                                                                                   |      |
| An Ultra-light and Flexible sEMG Active Probe for Patch-like Muscle Activity Monitoring .....                                                                                                                                           | 1442 |
| <i>Letizia Cantore, Fabio Rossi, Andrea Mongardi, Danilo Demarchi</i>                                                                                                                                                                   |      |
| Modular Sensor Network for Historic Buildings Structural Health Monitoring .....                                                                                                                                                        | 1446 |
| <i>Fábio M. Dias, Henrique A. Pocinho, Rita Machete, Ana Paula Falcão, Rita Bento, Diogo M. Caetano</i>                                                                                                                                 |      |
| MEMS Based Rain Sensor .....                                                                                                                                                                                                            | 1450 |
| <i>Pooja Thakkar, Povilas Smaliukas, Marta Kisielewska, Georg Brunnhofer, Andreas Tortschanoff</i>                                                                                                                                      |      |
| Performance Analysis of a Rotational Energy Harvester with a Dynamically Changing Potential Energy Function .....                                                                                                                       | 1454 |
| <i>Carlo Trigona, Suhail Ahmed Almani, Giuliano A. Salerno, Salvatore Baglio, Damian Gaska, Jerzy Margielewicz</i>                                                                                                                      |      |
| An Ultra-high Bandwidth Piezoelectric MEMS Accelerometer Towards Condition-based Monitoring.....                                                                                                                                        | 1458 |
| <i>Yiyao Liu, Ye Yuan, Yi Gong, Boyun Zhang, Danyang Zheng, Wei Pang, Menglun Zhang</i>                                                                                                                                                 |      |
| Analysis of Piezoresistive Silicon as Sense Element for use in Flexible Tactile Sensors.....                                                                                                                                            | 1462 |
| <i>Vartika Verma, Eslam Ahmed, Nicola Kovac, Christof Landesberger, Horst Gieser, Ralf Brederlow</i>                                                                                                                                    |      |
| Porous Silicon-Based Absorber Using Integration of Light Trapping and Anti-Reflective Layer .....                                                                                                                                       | 1466 |
| <i>Andras Kovacs, Julien Petit, Volker Bucher, U. Mescheder</i>                                                                                                                                                                         |      |
| Sensitivity-enhanced Planar Microwave Sensor for Rapid Human Fibrinogen Concentration Monitoring.....                                                                                                                                   | 1470 |
| <i>Adam Junck, Maryam Badv, Zahra Abbasi</i>                                                                                                                                                                                            |      |
| Joint Outdoor Ozone and Carbon Monoxide Prediction with a Carbon Nanotube Sensor Array Calibrated Using a Bayesian Framework .....                                                                                                      | 1474 |
| <i>Marine Dumon, Guillaume Perrin, Bérengère Lebental</i>                                                                                                                                                                               |      |
| Screen-Printed Graphene-Ink on a Fitted Sheet for Pressure Sensing and Sleeping Posture Recognition by Machine Learning Techniques .....                                                                                                | 1478 |
| <i>Nicola Pesce, Lavanya Rani Ballam, Fabrizio Marra, Alessio Tamburrano</i>                                                                                                                                                            |      |
| Enhanced Antibody Immobilization with Cold-Plasma-Modified Graphene Sensors and Functionalized Gold Nanoparticles .....                                                                                                                 | 1482 |
| <i>Felipe Longaray Kadel, Bruna Ferri Serafini, Duane da Silva Moraes, Mariana Rost Meireles, Julia Konzen Moreira, Thomas Sponchiado Pastore, Milleny Germann Souza, Giovana Dalpiaz, Susana Maria Kakuta, Thuany Garcia Maraschin</i> |      |
| High-Precision Fabrication of Graphene Nanoplatelet-Based Piezoresistive Strain Sensors Using PµSL 3D Printing Technology.....                                                                                                          | 1486 |
| <i>Engincan Tekin, Ming Cao, Ajay Giri Prakash Kottapalli</i>                                                                                                                                                                           |      |

|                                                                                                                                                |      |
|------------------------------------------------------------------------------------------------------------------------------------------------|------|
| System Integration of an Implantable Drug Delivery Device for Long-Term In-Vivo Experiments .....                                              | 1490 |
| <i>Fabiana Del Bono, Nicola Di Trani, Danilo Demarchi, Alessandro Grattoni, Paolo Motto Ros</i>                                                |      |
| Parametric Physics-Based Snow Model for Automotive Cameras .....                                                                               | 1494 |
| <i>Pak Hung Chan, Kurt Debattista, Valentina Donzella</i>                                                                                      |      |
| Effect of Periodic Rough Surface on Ultrasonic Pulse-echo Signal .....                                                                         | 1498 |
| <i>Hiroyuki Nakamoto, Kotaro Fujii, Philippe Guy, Tetsuya Uchimoto</i>                                                                         |      |
| All-Solution Processed Organic Fiber Photodetectors .....                                                                                      | 1502 |
| <i>Fangchen Zhu, Xueyuan Wu, Jianhua Xiao, Jiaao Wu, Xing Zheng, Yang Wang</i>                                                                 |      |
| Ultrasensitive Tilt Sensor Using Liquid Metal .....                                                                                            | 1506 |
| <i>Jinwon Jeong, Tanzila Noushin, Muhammad Luqman Haider, Jeong Bong Lee</i>                                                                   |      |
| A Novel TimesNet Based Electronic Nose Data Recovery Method .....                                                                              | 1510 |
| <i>Cong Gao, Guangfen Wei, Aixiang He, Shasha Jiao, Wei Zhang</i>                                                                              |      |
| A Plug-in OCT Module for in Situ Live Monitoring of Laser Processing .....                                                                     | 1514 |
| <i>Jinhan Zhao, Chaoliang Zhang, Jiangshan Ai, Yaoyu Ding</i>                                                                                  |      |
| Stretchable Pulse Wave Sensor with a Laser-Induced Graphene-Formed Kirigami Structure .....                                                    | 1518 |
| <i>Shintaro Oya, Taisei Kato, Gakuto Kagawa, Rihachiro Nakashima, Hidetoshi Takahashi</i>                                                      |      |
| Impact of Finger Contact Force on Aortic Waveform Parameters Derived from Finger<br>Photoplethysmography Using a Transfer Function .....       | 1522 |
| <i>James R. Cox, Mark Butlin, Ehad Akeila, Gisele J. Bentley, Alberto P. Avolio, Ahmad Qasem</i>                                               |      |
| A Closed-Loop Control System with Ultrafast Monitoring Based on a Photoelectric Sensor.....                                                    | 1526 |
| <i>Yuanming Yang, Qinhe Peng, Xinxing Yuan, Panyu Hou, Binxiang Qi, Luming Duan</i>                                                            |      |
| A Disposable Sensor for PM2.5 and PM10 Based on Wireless Magnetoelastic Resonators .....                                                       | 1530 |
| <i>Zeyu Li, Haowen Li, Yogesh B. Gianchandani</i>                                                                                              |      |
| TFT Active Pixel Sensors with Organic Photoconductive Films for Flexible Sensor Applications .....                                             | 1534 |
| <i>Koki Imamura, Kazunori Miyakawa, Shigeyuki Imura, Hiroto Sato</i>                                                                           |      |
| Extraction of Voluntary Muscle Contraction Based on PCA Reconstruction Error with a Reference<br>of Skin Deformation at Passive Movement ..... | 1538 |
| <i>Sung-Gwi Cho, Takuya Shimomura, Kengo Ohnishi</i>                                                                                           |      |
| Detection of Hidden non-Metallic Objects Using Electromagnetic Field .....                                                                     | 1542 |
| <i>Seitaro Kon, Ryosaku Kaji</i>                                                                                                               |      |
| Online Non-Myopic Route Planning for Airborne Sensor Networks with Multi-Target Tracking.....                                                  | 1546 |
| <i>Ye Yuan, Jianwei Wei, Xinwei Wei, Yiru Lin, Wei Yi, Xinyu Liu</i>                                                                           |      |
| Anchor-Free Relative 3D Pose Estimation Using Ultra-Wideband and Inertial Data Fusion .....                                                    | 1550 |
| <i>Xiaodong Cai, Lu Wang, Shouwei Sun, Hemin Han, Ke Han</i>                                                                                   |      |
| Nd Modified Bismuth Ferrite Perovskite for Efficient Subtle NO <sub>2</sub> Monitoring.....                                                    | 1554 |
| <i>Abhijit Narayan Eshore, Bidesh Mahata, Dipak Kumar Goswami, Prasanta Kumar Guha</i>                                                         |      |
| Effects of Annealing Temperature on Morphology and LSPR Sensing Performance of Au<br>Nanostructures .....                                      | 1558 |
| <i>Chih-Ching Ho, Chih-Jen Yu, Chia-Ming Yang</i>                                                                                              |      |

|                                                                                                                                                                    |      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Dwell Time Allocation for Decentralized Phased Array Radar Sensing Networks with Target Tracking.....                                                              | 1561 |
| <i>Ye Yuan, Zishi Zhang, Lei Zhu, Jing He, Wei Yi</i>                                                                                                              |      |
| Zirconia-based Electrochemical Sensor Utilizing Au-based Electrodes for Rapid Hydrogen Detection .....                                                             | 1565 |
| <i>Sri Ayu Anggraini, Yuki Fujio</i>                                                                                                                               |      |
| MEMS Gas Sensor with On-chip Electrospun Ru-SnO <sub>2</sub> Nanospheres Patterned by Photolithography .....                                                       | 1569 |
| <i>Jin Li, Xitong Sun, Tongheng Cheng, Fei Wang</i>                                                                                                                |      |
| Gas Sensing Kinetic Analysis: A Theoretical Approach Towards Multiple Gas Discrimination.....                                                                      | 1573 |
| <i>Snehanjan Acharyya, Prasanta Kumar Guha, Soumyo Mukherji</i>                                                                                                    |      |
| Simultaneous Measurement of Refractive Index and Temperature by Cascading Beveled Hollow-Core Fiber and Fiber Bragg Grating .....                                  | 1577 |
| <i>Jia-Yuan Liu, Wen-Fung Liu, Chin-Ping Yu</i>                                                                                                                    |      |
| Controllable Starching Treatment for High-Performance Strain Sensors and EMG Electrodes in Smart Garments .....                                                    | 1581 |
| <i>Wentian Yi, Chenyu Tang, Muzi Xu, Luigi G. Occhipinti</i>                                                                                                       |      |
| Estimating Suture Needle Size via Selective Detuning of Chipless RFID Tags.....                                                                                    | 1585 |
| <i>Florian Geiss, Rahul Bhattacharyya, Denise Tellbach, Sanjay E. Sarma</i>                                                                                        |      |
| Lens-Free Shadow Imaging-Based Cell Classification with Deep Learning for Improved CDC Crossmatching .....                                                         | 1589 |
| <i>Kang Choi, Sanghoon Shin, Hyungsik Kim, Huijin Rim, Minjeong Nam, Yunjung Cho, Sungkyu Seo</i>                                                                  |      |
| Cellytics: A Digital Inline Holography Platform for Single Cell Analysis in Biomedical and Environmental Applications .....                                        | 1593 |
| <i>Hojin Cheon, Sanghoon Shin, Hyungsik Kim, Huijin Rim, Hyeji Jang, Haehee Han, Kang Choi, Samir Kumar, Inha Lee, Sunmi Han, Hyun Sik Jun, Sungkyu Seo</i>        |      |
| Investigation ofNK Cell Activity in Healthy and Immunocompromised Individuals Using Lens-Free Shadow Imaging Technology .....                                      | 1597 |
| <i>Hyeji Jang, Hojin Cheon, Sanghoon Shin, Haehee Han, Samir Kumar, Inha Lee, Sunmi Han, Myung-Hyun Nam, Ka-Won Kang, Byung Soo Kim, Hyun Sik Jun, Sungkyu Seo</i> |      |
| Airflow Optimization for Olfactory Display Using Inkjet Device .....                                                                                               | 1601 |
| <i>Nilava Debabhuti, Dani Prasetyawan, Takamichi Nakamoto</i>                                                                                                      |      |
| Reconfigurable Intelligent Surface Aided Wireless Sensor Networks with Harvest-Then-Transmit Protocol .....                                                        | 1605 |
| <i>Yinman Lee, Li-Zhen Hsu</i>                                                                                                                                     |      |
| Rapid and Field Portable Water Quality Monitoring Using Lens-Free Shadow Imaging Technology and Machine Learning.....                                              | 1609 |
| <i>Hyungsik Kim, Sanghoon Shin, Huijin Rim, Haehee Han, Kang Choi, Samir Kumar, Hoon Choi, Wonsoo Kang, Moonjin Lee, Sungkyu Seo</i>                               |      |
| Integration of Single-Foot Impedance Plethysmography and Ballistocardiography on an Shoe Insole for Robust Heartbeat Detection .....                               | 1613 |
| <i>José A. García-Limón, Ramon Casanella, Carlos Alvarado-Serrano, Oscar Casas</i>                                                                                 |      |

|                                                                                                                                                                             |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Long-term Durability Evaluation of Hetero-core Optical Fiber Hydrogen Sensor Composed of Palladium Nanoparticles and Poly-L-lysine .....                                    | 1617 |
| <i>Yuna Nakamura, Kazuhiro Watanabe, Michiko Nishiyama</i>                                                                                                                  |      |
| Hetero-Core Fiber Optic Glucose Sensor Coated with Glucose Oxidase Immobilized in pH-Sensitive Polymer Multilayer of Poly-L-Lysine and Poly Acrylic Acid.....               | 1621 |
| <i>Deepro Banerjee, Kazuhiro Watanabe, Michiko Nishiyama</i>                                                                                                                |      |
| Low-Frequency Structural Vibration Monitoring Using a Hetero-Core Fiber Optic Accelerometer .....                                                                           | 1625 |
| <i>Atsuki Hirose, Miyuki Kadokura, Tokio Kasai, Kazuhiro Watanabe, Michiko Nishiyama</i>                                                                                    |      |
| Snowflake-Patterned CNT/LIG@SEBS-Based Dry Electrodes for Reliable Arrhythmia Diagnosis.....                                                                                | 1629 |
| <i>Moon Seong Jo, Gagan Bahadur Pradhan, Seung Jae Lim, Jae Yeong Park</i>                                                                                                  |      |
| Phenomenological Model for a Light-Activated Gas Sensor .....                                                                                                               | 1633 |
| <i>Juan Luis Soler-Fernández, Olga Casals, Cristian Fàbrega, Angel Dieguez, J. Daniel Prades, Oscar Alonso</i>                                                              |      |
| A Data Driven Correction Algorithm for Inverse Problems with Application to Spectral Reconstruction.....                                                                    | 1637 |
| <i>Jonathan Laubmann, Stefan Saloman, Julio Wissing, Wladimir Tschekalinskij, Sebastian Hettenkofer, Alessio Stefani, Teresa Scholz</i>                                     |      |
| Analysis of the Relation Between Shoulder Joint Angle and Bioelectrical Impedance on Deltoid Muscle .....                                                                   | 1641 |
| <i>Hirochika Matsui, Kengo Ohnishi, Sung-Gwi Cho</i>                                                                                                                        |      |
| Improving the Reliability of Wireless Pressure Sensors by Optimizing the Fabrication Process.....                                                                           | 1645 |
| <i>Jinliang Wei, Nomin-Erdene Oyunbaatar, Dong-Su Kim, Lei Wang, Yun-Jin Jeong, Dong-Weon Lee</i>                                                                           |      |
| GaN Monolithic Chips for Rapid Temperature Sensing.....                                                                                                                     | 1649 |
| <i>Hongying Yang, Yumeng Luo, Kwai Hei Li</i>                                                                                                                               |      |
| Field Evaluation of a High-Resolution NDIR Sensor System for Measurement of Methane in Water .....                                                                          | 1653 |
| <i>Bakhram Gaynullin, Henrik Rödjegård, Claes Mattsson, Christine Hummelgård, Göran Thungström</i>                                                                          |      |
| Bolt Type Force Sensor with Improved Wiring for Force Measurement in Sport Climbing .....                                                                                   | 1657 |
| <i>Takumi Hayashida, Akihiro Kawamura, Ryo Kurazume, Shimpei Aihara</i>                                                                                                     |      |
| Signal Response Investigation of Skin Deformation and sEMG on the Biceps Brachii Muscle During Isometric Elbow Flexion .....                                                | 1661 |
| <i>Takuya Shimomura, Sung-Gwi Cho, Hirochika Matsui, Kengo Ohnishi</i>                                                                                                      |      |
| SiC Micro-Hot Wires for Flow Measurement in Harsh Environments .....                                                                                                        | 1665 |
| <i>Sylvain Kern, Aurélien Mazzamurro, Cécile Ghouila-Houri, Thomas Arnoult, Romain Viard, Djamila Hourlier, Laure Tandt, Philippe Pernod, Marc Portail, Abdelkrim Talbi</i> |      |
| Smartphone Video-Based Blood Pressure Estimation via Pulse Transit Time and Machine Learning .....                                                                          | 1669 |
| <i>Vishal Singh Roha, Maggie Ezzat Gaber Gendy, Mehmet R. Yuce</i>                                                                                                          |      |
| In-Situ Characterization of Stainless Steel Probes-Based Soil Electrical Conductivity Sensor .....                                                                          | 1673 |
| <i>Sheng Ding, Shad Roundy, Ramesh Goel, Cody Zesiger, Darrin J. Young</i>                                                                                                  |      |
| High Performance Hydrogen Sensors Based on Tellurium Nanobelt Field-Effect Transistors .....                                                                                | 1677 |
| <i>Yu Guo, Jianping Zhang, Zhen Yuan, Huiling Tai</i>                                                                                                                       |      |

|                                                                                                                                                                                                                             |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Piezoresistive Accelerometer Based on Amorphous Carbon Films.....                                                                                                                                                           | 1681 |
| <i>Qi Zhang, Xing Pang, Yulong Zhao</i>                                                                                                                                                                                     |      |
| Pulse Repetition Rate and Unwrapping Limits in OTDR Fiber Optic Sensing Systems.....                                                                                                                                        | 1685 |
| <i>Danilo Fernandes Gomes, Beatriz Brusamarello, Guilherme Heim Weber, Daniel Rodrigues<br/>Pipa, Jean Carlos Cardozo da Silva, Sergio Taveira de Camargo Junior, Manoel Feliciano da<br/>Silva Junior, Cicero Martelli</i> |      |
| A Multi-Directional Pendulum-Based Energy Harvester for Self-Powered and Distributed Ocean<br>Environment Monitoring .....                                                                                                  | 1689 |
| <i>Haopeng Xie, Hailing Fu, Zhiyi Wu, Nikolaos A. Chrysochoidis, Theofanis S. Plagianakos,<br/>Fang Deng</i>                                                                                                                |      |
| The Development of Rumen Bacteria Microbial Fuel Cell in Anaerobic Environments .....                                                                                                                                       | 1693 |
| <i>Yasutaka Shimizu, Jarred Fastier-Wooler, Yoshihiro Muneta, Hiroshi Sawada, Michitaka<br/>Yamamoto, Seiichi Takamatsu, Shozo Arai, Toshihiro Itoh</i>                                                                     |      |
| A Wafer-level Package Design with Symmetrical Out-plane Electrodes for 3D-MEMS Devices .....                                                                                                                                | 1697 |
| <i>Jianjun Ma, Jincui Cui, Shuangxin Huang, Qilin Cai, Qi Wei, Bin Zhou, Rong Zhang</i>                                                                                                                                     |      |
| Lightweight Energy-Constraint Wireless Sensor Solution for Plant Monitoring .....                                                                                                                                           | 1701 |
| <i>Sarah Goossens, Jona Cappelle, Guus Leenders, Thomas Reher, Valentijn De Smedt, Bram<br/>Van de Poel, Lieven De Strycker, Liesbet Van der Perre</i>                                                                      |      |
| A Method to Boost the Sensitivity in Transmission-Mode Phase-Variation Planar Microwave<br>Sensors .....                                                                                                                    | 1705 |
| <i>Xavier Canalias, Paris Vélez, Pau Casacuberta, Lijuan Su, Ferran Martín</i>                                                                                                                                              |      |
| Electrolyte-Gated Field-Effect Transistor-Based Sensor for Nanoplastic Detection: A Sensitivity<br>Investigation of Two Nanoplastic Models.....                                                                             | 1709 |
| <i>Giulia Elli, Manuela Ciocca, Bajramshahe Shkodra, Pietro Ibba, Paolo Lugli, Luisa Petti</i>                                                                                                                              |      |
| UWB-Visual-Inertial Fusion Localization with Fast and Robust UWB Extrinsic Calibration.....                                                                                                                                 | 1713 |
| <i>Zhognqi Yin, Wenqiang Li, Feng Shen</i>                                                                                                                                                                                  |      |
| A Low-Power Intelligent Wearable System with Multi-Sensors and Lightweight Machine Learning<br>Algorithm for Motion-Status Monitoring.....                                                                                  | 1717 |
| <i>Ziyue Kong, Hailing Fu, Yeyun Cai, Dong Jiang, Fang Deng</i>                                                                                                                                                             |      |
| Simultaneous Non-Contact Vital Sign Monitoring on Multiple Moving Targets for Daily In-Home<br>Healthcare with a Single Fmcw Radar .....                                                                                    | 1721 |
| <i>Yuxiang Qiu, Michitaka Yamamoto, Seiichi Takamatsu, Toshihiro Itoh</i>                                                                                                                                                   |      |
| High-Precision Prediction of NO <sub>x</sub> , NO <sub>2</sub> and C <sub>6</sub> H <sub>6</sub> by Multiple Gas Sensors Using a Novel<br>Cascaded MLP-LSTM Model .....                                                     | 1725 |
| <i>Kai Yang Ng, Duc Thang Ngo, Paul C.-P. Chao, Ray Hua Horng, Jia-Min Shieh</i>                                                                                                                                            |      |
| Sixteen-micromachined-gyroscopes Array Beyond Accuracy Limit By 1.9 Times Without<br>Bandwidth Reduction .....                                                                                                              | 1729 |
| <i>Jiayu Li, Honglong Chang, Junzhe Yun, Jiyao Liu, Wenjie Lv, Yan Wang, Jie Zhang, Bin Han,<br/>Qiang Shen</i>                                                                                                             |      |
| Exploring pH Sensing in MoS <sub>2</sub> -Based ISFETs with 2D-3D Gate Oxide Stacks .....                                                                                                                                   | 1733 |
| <i>Sarath S, Rajendra P. Shukla, Chandan Yadav, Gopi Krishna Saramakala</i>                                                                                                                                                 |      |

|                                                                                                                                                                                                                                            |      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| A Droplet Screening System for Discovery of Slow-Growing Microbes from Environment Through Long-Term Culture .....                                                                                                                         | 1737 |
| <i>Byeolnim Oh, Mingyeong Kang, So-Ra Ko, Moon Sung Son, Jaewon Park, Chi-Yong Ahn, Hyun Soo Kim</i>                                                                                                                                       |      |
| Toward Continuous Monitoring of Concrete Health Via PVDF Receiver.....                                                                                                                                                                     | 1741 |
| <i>Heejin Hwang, Shinyeon Kim, Minjeong Kim, Seungyeon Lee, Moonjung Kwak, Soomin Kwon, Youngjun Joo, Seung Hyun Song</i>                                                                                                                  |      |
| Design and Development of Dual Point Photoplethysmography Device for Assessing Impact of Diabetes on Arterial Stiffness.....                                                                                                               | 1745 |
| <i>Apakrita Tayade, Saurav Kumar, Prabhat Kumar, Ravi Bhallamudi</i>                                                                                                                                                                       |      |
| A Fast Start Method for Whole-Angle Micro-Shell Resonator Gyroscope .....                                                                                                                                                                  | 1749 |
| <i>Sheng Yu, Xuezhong Wu, Yongmeng Zhang, Jiangkun Sun, Dingbang Xiao</i>                                                                                                                                                                  |      |
| Gain and Distortion Optimization for Fast-Startup AC-Coupled Baseband Amplifiers in Motion-Sensing Radar.....                                                                                                                              | 1753 |
| <i>Aaron B. Carman, Christopher Williams, Changzhi Li</i>                                                                                                                                                                                  |      |
| Design of Micro-Security Device Based on Three-Stage Electric-Thermal Mechanism .....                                                                                                                                                      | 1757 |
| <i>Wanming Wang, Tengjiang Hu, Jing Sun, Yulong Zhao</i>                                                                                                                                                                                   |      |
| Fabrication and Temperature Test of a Multi-Physics Coupling MEMS Sensor Chip .....                                                                                                                                                        | 1761 |
| <i>Jing Sun, Guodong Zhang, Wanming Wang, Tengjiang Hu, Yulong Zhao</i>                                                                                                                                                                    |      |
| Fibre Optic Interrogated Palpation Sensor for Mechanical Tissue Assessment in Minimally Invasive Surgery .....                                                                                                                             | 1765 |
| <i>Mark W. McDonald, Ciara B. Durcan, Mahmood A. Saleh, Robert L. Reuben, Duncan P. Hand, Yuhang Chen, William N. MacPherson</i>                                                                                                           |      |
| Flexible Coils Localization Using Optically Pumped Magnetometers for Biomedical Applications.....                                                                                                                                          | 1769 |
| <i>Céline Vergne, Hugo Nicolas, Simon Lemoigne, Joris Pascal</i>                                                                                                                                                                           |      |
| A 40-KS/s In-Plane Stress Sensing $\Delta\Sigma$ Frontend Integrated into a 2×48 Needle-Shaped Array .....                                                                                                                                 | 1773 |
| <i>Christoph Grandauer, Daniel De Dorigo, Daniel Wendler, Roman Willaredt, Michael Kult, Yiannos Manoli, Matthias Kuhl</i>                                                                                                                 |      |
| A DFT Study and In-Situ Analysis of Hydrogen Adsorption on Palladium Alloys.....                                                                                                                                                           | 1777 |
| <i>Jianping Zhang, Junge Liang, Yu Guo, Zhen Yuan, Huiling Tai</i>                                                                                                                                                                         |      |
| Deep Neural Network to Remove Motion Artifacts from Heart Rate Sensor Embedded on Handle Cane.....                                                                                                                                         | 1781 |
| <i>Rafael Villalba-Bravo, Paula Ruiz-Barroso, Francisco M. Castro, Andrés Truiillo-León, Nicolás Guil, Fernando Vidal-Verdú</i>                                                                                                            |      |
| Effect of Metallic Ion Implantation on Dark Current Distributions of Silicon-Based CMOS Image Sensors .....                                                                                                                                | 1785 |
| <i>Juan Esteban Montoya Cardona, Sylvain Joblot, Pierre Kermagoret, Grégoire Ducotey, Stéphane Hardillier, Guillaume Dupeux, Yannick Borde, Jean-Pierre Carrère, Sandrine Lhostis, Richard Monflier, Olivier Marcelot, Vincent Goiffon</i> |      |
| Leveraging Large Language Models and Fuzzy Clustering for EEG Report Analysis .....                                                                                                                                                        | 1789 |
| <i>Chengzong Zhao, Zara Cook, Livia Murray, Jivan Kesan, Nabil Belacel, Sam Doesburg, George Medvedev, Vasily Vakorin, Pengcheng Xi</i>                                                                                                    |      |

|                                                                                                                                                |      |
|------------------------------------------------------------------------------------------------------------------------------------------------|------|
| A Bias-Tunable Dual Band Photodetector for Plastic Material classification .....                                                               | 1793 |
| <i>A. Manakkakudy Kumaran, A. De Iacovo, A. Ballabio, J. Frigerio, G. Isella, L. Colace</i>                                                    |      |
| Experimental Investigation on Phase Noise Induced Interference in Coherently-Detected OTDR .....                                               | 1797 |
| <i>Zexu Liu, Muyang Wang, Weiqi Lu, Lei Liu, William Shieh</i>                                                                                 |      |
| A Dual Input Five Output Solar Energy Harvester with 93.46% Peak Efficiency for Heterogeneous<br>Wireless Sensor Node Applications.....        | 1800 |
| <i>Murali K. Rajendran, Gajendranath Chowdary</i>                                                                                              |      |
| Design Aspects for Eddy Current Displacement Sensors in High Temperature Environments.....                                                     | 1804 |
| <i>G. Gruber, M. Neumayer, B. Schweighofer, H. Wegleiter</i>                                                                                   |      |
| A Dual Port Low Reflection Microwave Angular Displacement Sensor Based on Transversal Signal<br>Interference Principle .....                   | 1808 |
| <i>Desen Li, Kam-Weng Tam, Zhuowei Zhang, Chi-Hou Chio, Xin Zhou, Qiwei Chen, Junxiao<br/>Liu, Ngai Kong, Cheng Teng, Hon-Pan Sio</i>          |      |
| Theory and Design of Tunable Localized Plasmonic Biosensors Using Au-Ag Bimetallic Alloy<br>Nanoparticles.....                                 | 1812 |
| <i>Mochamad Januar, Bei Liu, Kou-Chen Liu</i>                                                                                                  |      |
| An Ultra Sensitive Malaria Detection Platform Based on Magnetic Biosensors.....                                                                | 1816 |
| <i>Yuanxi Cheng, Rik Van Haren, Huxi Wang, Lisa Ranford Cartwright, Nosrat Mirzai, Hadi<br/>Heidari</i>                                        |      |
| UV Irradiated MoO <sub>3</sub> thin film for Sensing of Dibutyl Sulfide: A Mustard Gas Simulant .....                                          | 1820 |
| <i>Jatinder Pal Singh, Anjali Sharma, Monika Tomar, Arijit Chowdhuri</i>                                                                       |      |
| Sensing and Localization of Multiple Defects in Pipes with Pulse-echo Mode Torsional Guided<br>Wave Ultrasonics.....                           | 1824 |
| <i>Sheetal Patil, Sauvik Banerjee, Siddharth Tallur</i>                                                                                        |      |
| On the Cramér-Rao Bound for Bacterial Sensors.....                                                                                             | 1828 |
| <i>Florian Ander, Martin Damrath, Mladen Veletić, Ilangko Balasingham</i>                                                                      |      |
| Simultaneous Description and Detection of Sparse Features for Deformable Intraoperative Bladder<br>Environments.....                           | 1832 |
| <i>Franziska Krauß, Matthias Ege, Zoltan Lovasz, Johannes Schüle, Aleksander Kielbik, Carina<br/>Veil, Oliver Sawodny</i>                      |      |
| ISAR Imaging of Near-Shore Maritime Vessels using a Low-Cost X-band Radar .....                                                                | 1836 |
| <i>Nicole Pham, Dylan Wesen, John Mower, Matthew S. Reynolds</i>                                                                               |      |
| Dynamic Sensing of an Embedded Object Using Laser, Camera, and Collaborative Robot.....                                                        | 1840 |
| <i>John Bannan, Nazia Rahman, Chang-Hee Won</i>                                                                                                |      |
| Can QR Codes be used to readout Colorimetric Gas Sensors? A Back-Compatible Color QR Code<br>with an Embedded CO <sub>2</sub> Sensor Dye ..... | 1844 |
| <i>Ismael Benito-Altamirano, Laura Engel, Ferran Crugeira, Miriam Marchena, Cristian<br/>Fàbrega, Jürgen Wöllenstein, J. Daniel Prades</i>     |      |
| A High Resolution Phase Shift Detection System for a Differential Multimode Fiber Refractometer.....                                           | 1848 |
| <i>Olivier Bernal, Ardi Rahman, Haris Apriyanto, Frederic Surre, Saroj Pullteap, Han Cheng<br/>Seat</i>                                        |      |

|                                                                                                                                                                   |      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Broadband Response Photodetectors Based on Lead-Free Perovskite Quantum Dots/Transfer-Free Green Graphene Heterojunctions .....                                   | 1852 |
| <i>Yu-Yun Sun, Jian-Hong Du, Yu-Lin Qiu, Yu-Chi Hu, Meng-Lin Tsai, Sheng-Kuei Chiu, Ji-Lin Shen, Chiashain Chuang, Dung-Sheng Tsai</i>                            |      |
| Flexible Tactile Sensing Using PDMS/TiO <sub>2</sub> Based Capacitor with MOSFET Structure .....                                                                  | 1856 |
| <i>Kamalesh Tripathy, Dhanranjan Kumar, Karthick Thiyagarajan, Mitradiip Bhattacharjee</i>                                                                        |      |
| Plasmon-Induced Concentric Hexagonal Ring Resonator for Nanophotonic Sensing .....                                                                                | 1860 |
| <i>Shyamal Guchhait, Subhasri Chatterjee, Tapas Chakravarty, Nirmalya Ghosh</i>                                                                                   |      |
| Tactile Zero-Shot Sensing of Breast Tumors: Recognition of Human Data from Phantom Data.....                                                                      | 1864 |
| <i>Arpita Das, Dina Caroline, Chang-Hee Won</i>                                                                                                                   |      |
| Size-Resolved Concentration Estimation of Nano- and Micro-Plastics for Different Water Salinity with Nanoelectrode Array Sensors .....                            | 1868 |
| <i>Daniele Goldoni, Luigi Rovati, Luca Selmi</i>                                                                                                                  |      |
| Unobtrusive Spatial Localization of Impact Induced Soundwaves using 2D Beamforming Algorithm .....                                                                | 1872 |
| <i>Mayukh Biswas, Raj Rakshit, Amit Swain, Snehasis Das, Ronit Ray Samajder, Chirabrata Bhaumik, Arun Kumar Majumder</i>                                          |      |
| Constant Envelope Orthogonal Frequency-Division Multiplexing with Selective Mapping .....                                                                         | 1876 |
| <i>Hao Chen, Yanrui Wang, Lilin Dan, Juan Zhang, Yue Xiao</i>                                                                                                     |      |
| Design and Optimization of Wideband MEMS Energy Harvester Using Graph Neural Network .....                                                                        | 1880 |
| <i>Aylar Abouzarkhanifard, Ting Zou, Mohammad Al Janaideh, Lihong Zhang</i>                                                                                       |      |
| Four-Channel NFC System for Electrochemical Sensing of Fluids .....                                                                                               | 1884 |
| <i>Giulio Maria Bianco, Vincenzo Mazzaracchio, Luca Fiore, Fabiana Arduini, Gaetano Marrocco, Cecilia Occhiuzzi</i>                                               |      |
| A Portable Electrical Impedance Measurement System for Flexible Electrodes.....                                                                                   | 1888 |
| <i>Mahdi Saleh, Sara Medina-Lombardero, Michael L. Crichton, Alexander J. Casson</i>                                                                              |      |
| Analysis of Energy Harvesting in Beyond Diagonal-RIS-Enabled WSNs.....                                                                                            | 1892 |
| <i>Amit Kr Pandit, Kunal Agham, Ajeet Singh Shekhawat, Yatindra Nath Singh</i>                                                                                    |      |
| Shielding of Eddy Current Displacement Sensors with a Single Backside Shield .....                                                                                | 1896 |
| <i>G. Gruber, M. Neumayer, B. Schweighofer, H. Wegleiter</i>                                                                                                      |      |
| Generalised Spatial Modulation Assisted Constant Envelope OFDM.....                                                                                               | 1900 |
| <i>Yanrui Wang, Hao Chen, Lilin Dan, Juan Zhang, Yue Xiao</i>                                                                                                     |      |
| Fully Printed Low-Cost Ammonia Gas Sensor on Paper Substrate.....                                                                                                 | 1904 |
| <i>Sahira Vasquez, Bajramshahe Shkodra, Almudena Rivadeneyra, Martina Aurora Costa Angeli, Antonio Altana, Ciro Allarà, Pietro Ibba, Paolo Lugli, Luisa Petti</i> |      |
| Deep RL Based Obstacle Avoidance for UAVs with Time Varying Sensor Bias.....                                                                                      | 1908 |
| <i>Aditya Kurande, Bhaskar Joshi, Harikumar Kandath</i>                                                                                                           |      |
| Integrated Silicon-On-Insulator Based Mesh Membrane for Continuous Monitoring in Organs-on-a-chip.....                                                            | 1912 |
| <i>Mariia Zakharova, Mar Córdor, Sohail F. Shaikh, Aaron Delahanty, Dries Braeken, Andries D. Van Der Meer, Loes I. Segerink</i>                                  |      |

|                                                                                                                                                                                                                                                                               |      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Event Intensity Decay with Event Cameras for Efficient Object Detection .....                                                                                                                                                                                                 | 1916 |
| <i>Pieter Meiresone, David Van Hamme, Wilfried Philips</i>                                                                                                                                                                                                                    |      |
| Sparsity-Aware Occupancy Grid Mapping for Automotive Driving Using Radar-LiDAR Fusion .....                                                                                                                                                                                   | 1920 |
| <i>Peiyuan Zhai, Geethu Joseph, Nitin Jonathan Myers, Çağan Önen, Ashish Pandharipande</i>                                                                                                                                                                                    |      |
| Soft Capacitive Sensor and Wearable Sleeve Towards Measuring Fluid Retention .....                                                                                                                                                                                            | 1924 |
| <i>Damla Leblebicioglu, Henry Gao, Immanuel Ampomah Mensah, Muhammad Saad Khan, Kristen L. Dorsey</i>                                                                                                                                                                         |      |
| Optimization and Application of Laser-Induced Graphene Electrodes with Nickel Hydroxide Nanoparticles for Ultrasensitive Non-Enzymatic Glucose Sensing .....                                                                                                                  | 1928 |
| <i>Rourke Sylvain, Tyler Waslawski, Verdict Vera, Grace Dykstra, Georgia Heintz, Smitha Rao, Yixin Liu</i>                                                                                                                                                                    |      |
| Multi-Sensor Integration in Orthopedic Implants for Total Knee Arthroplasty .....                                                                                                                                                                                             | 1932 |
| <i>Gasnier Pierre, Nonglaton Guillaume, Fourcade Paul, Rammouz Ramzy, Brulais Sébastien, Gauroy Martin, Frassati Francois, Descharles Mélanie, Gougis Maxime, Chatard Charles, Moro Cécile, Le Stum Mathieu, Leconte Liz, Dardenne Guillaume, Fuchs Olivier, Stindel Eric</i> |      |
| Photonic-Based Wearable Sensor for Upper Limb Rehabilitation .....                                                                                                                                                                                                            | 1936 |
| <i>Nour Al-Rahmani, Noora A. Alhashmi, Showq M. Alhammadi, Alanood S. Alameri, Fatema I. Almarzooqi, Doua Kosaji, Mohammad I. Awad, Kinda Khalaf, M. Fátima Domingues</i>                                                                                                     |      |
| Design and Characterization of a Printed Circuit Board-Based Gas Chromatography Column for Greenhouse Gas Analysis .....                                                                                                                                                      | 1940 |
| <i>Ashur Rael, Ezekiel Garcia, Nathan Wolff, Antonio Rubio, Haley Bennett, Joshua Whiting, Philip R Miller</i>                                                                                                                                                                |      |
| Graphene-PVDF Aerogel Composites for Humidity Sensing Applications .....                                                                                                                                                                                                      | 1944 |
| <i>Negin Faramarzi, Saeed Ur Rahman, Samira Lakouraj Mansouri, Babar Ali, Hossein Cheraghi Bidsorkhi, Alessandro Giuseppe D'Aloia, Maria Sabrina Sarto</i>                                                                                                                    |      |
| A Methodology for Developing and Evaluating FBG-Based Smart 3D-Printed Prosthetics.....                                                                                                                                                                                       | 1948 |
| <i>Doua Kosaji, Nour Al-Rahmani, Fatima Abdallah, Mariam Alhmoudi, Maryam Aljaberi, Rashed Al-Ali, Mohammad I. Awad, Kinda Khalaf, M. Fatima Domingues</i>                                                                                                                    |      |
| Cantilever-Plate Piezoelectric Micromachined Ultrasonic Transducer (PMUT) for Airborne Applications with Enhanced Output and Linear Working Range .....                                                                                                                       | 1952 |
| <i>Zhou Da, Rodrigo Tumolin Rocha, Alessandro Stuart Savoia, Chunlei Xu, Tingzhong Xu</i>                                                                                                                                                                                     |      |
| Low-Cost Water Level Sensor with Improved Data Quality for Flash Flood Monitoring in Urban Areas.....                                                                                                                                                                         | 1956 |
| <i>M. Frontera-Bergas, F. Mestre-Sansó, R. Sanchez, E. Isern, B. Alorda-Ladaria</i>                                                                                                                                                                                           |      |
| Microbial Fuel Cell (MFC)-Based in-Situ Water Toxicity Biosensor for Monitoring Heavy Metals and BTEX.....                                                                                                                                                                    | 1960 |
| <i>Jong-Hyun Baik, Jae-Hoon Hwang, Keugtae Kim, Woo Hyoung Lee</i>                                                                                                                                                                                                            |      |
| Wireless Sensor Nodes for Condition Based Maintenance in Railway Systems .....                                                                                                                                                                                                | 1964 |
| <i>Philipp Kersten, Johannes Buzin, Soeren Hirsch</i>                                                                                                                                                                                                                         |      |
| Fabrication of 3D Screen-Printed Micro-Cavities Towards Sweat Sensors for Integrated Flexible Hybrid Electronics.....                                                                                                                                                         | 1968 |
| <i>Cameron Anderson, Z. Hugh Fan, Jorg Richsteirr, Mark Sussman, Toshikazu Nishida</i>                                                                                                                                                                                        |      |

|                                                                                                                                                                                               |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Temperature Sensor Fabricated via Direct Laser Writing on Copper Nanoparticles Coated Paper Substrates .....                                                                                  | 1972 |
| <i>Ciro Allarà, Sahira Vasquez, Mukhtar Ahmad, Pietro Ibba, Martina Aurora Costa Angeli, Antonio Altana, Almudena Rivadeneyra, Niels Benson, Paolo Lugli, Luisa Petti</i>                     |      |
| Multi-modal Photo-responsive Planar Microwave Resonant-based Colorimetric Analysis of Liquid-Color Compound for Biomedical Applications .....                                                 | 1976 |
| <i>Zahra Sarpanah Sourkouhi, Vishal Balasubramanian, Mohammad H. Zarifi</i>                                                                                                                   |      |
| Investigation of Long-Term Embedded RFID Sensors for Structural Health Monitoring.....                                                                                                        | 1980 |
| <i>S. Johann, H. Kohlhoff, J. Schlischka, C. Strangfeld, M. Bartholmai, K. Smarsly</i>                                                                                                        |      |
| Electrochemical Fingerprinting for Discrimination of $\beta_{3-16}$ , $A\beta_{11-16}$ and their Pyroglutamate Counterparts, Related to Alzheimer's Disease .....                             | 1984 |
| <i>Aleksandra Tobolska, Katarzyna Biernat, Nina E. Wezynfeld, Wojciech Wróblewski, Patrycja Ciosek-Skibińska</i>                                                                              |      |
| Experimental Investigation of Microstructured and Capillary Optical Fibers for Refractive Index Measurement from 1.316 to 1.425 RIU .....                                                     | 1988 |
| <i>Ardi Rahman, Flavien Beffara, Haris Apriyanto, Olivier Bernal, Frederic Surre, Georges Humbert, Jean-Louis Auguste, Han Cheng Seat</i>                                                     |      |
| Diagnosis of Interstitial Cystitis with Single-chip Multiplexed Biosensing Array of Urine Biomarkers at the Point-of-Care.....                                                                | 1992 |
| <i>Tanzila Noushin, Jinwon Jeong, Muhammad Luqman Haider, Jeong Bong JB Lee</i>                                                                                                               |      |
| Integration of Ballistocardiogram with PPG and ECG Using a CNN-LSTM Model for Cuff-Less Blood Pressure Estimation .....                                                                       | 1996 |
| <i>Nadia Yaghoobi, Mohammad Narimani, Edward J. Park</i>                                                                                                                                      |      |
| Collision-avoidance LoRaWAN Network for Intermittent Sensor Systems.....                                                                                                                      | 2000 |
| <i>Firdaus Ritom, Fatma Benkhelifa, Sergey Mileiko, Domenico Balsamo</i>                                                                                                                      |      |
| Multiarray Gas Sensors Based on Nanoporous Layers Produced à la carte by Spark Ablation Using Metal Oxides, Binary and Ternary Alloys .....                                                   | 2004 |
| <i>Leandro Nicolás Sacco, Niels Schouten, Larissa Egger, Maxim Popov, Anton Köck, Christoph Dösinger, Lorenz Romaner</i>                                                                      |      |
| Harvesting Kinetic Energy from Rain Gauge Tipping Motion Using Electromagnetic Induction .....                                                                                                | 2008 |
| <i>Ma Aida James, Mark Dutton, Sergey Mileiko, Domenico Balsamo</i>                                                                                                                           |      |
| Empowering Energy-Aware Task Operations and Timekeeping with Intermittent Sensor Systems .....                                                                                                | 2012 |
| <i>Sergey Mileiko, Firdaus Ritom, Domenico Balsamo</i>                                                                                                                                        |      |
| Polarized IrOx Enables Novel Referencing for Biocompatible L-Glutamate Sensors .....                                                                                                          | 2016 |
| <i>Mohamed Benomar, Mao-Hsiang Huang, Sung Sik Chu, Xing Xia, Hung Cao</i>                                                                                                                    |      |
| Characterization of Graphene-based Flexible One- Side-Coil NFC Tag for Temperature Sensing.....                                                                                               | 2020 |
| <i>N. M. Faudzi, A. R. Razali, A. A. Manaf, N. H. A. Rahman, A. A. Azlan, A. Ibrahim, A. M. Mozi, S. M. Hafiz, S. Sulaiman, N. A. Rashid</i>                                                  |      |
| Bridge Vibration Measurements from Very High-Resolution Spaceborne SAR .....                                                                                                                  | 2024 |
| <i>Aleksanteri B. Vattulainen, Finlay Rollo, Alessandro Lotti, Daniel Tonelli, Sebastian Diaz Riofrio, Enrico Tubaldi, Daniele Zonta, Christos Ilioudis, Pietro Milillo, Carmine Clemente</i> |      |

|                                                                                                                                                                |      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Designing Capacitive Micromachined Ultrasonic Transducer (CMUT) Based Sensors for Low Frequency Airborne Applications .....                                    | 2028 |
| <i>Sebastian Peller, Rudolf Bierl, Amelie Hagelauer</i>                                                                                                        |      |
| Target Isolation and Enhancement Through Coherent Multi-View Vital-Doppler Detection.....                                                                      | 2032 |
| <i>Christopher Williams, Syed Doha Uddin, Changzhi Li</i>                                                                                                      |      |
| Hybrid Technique for Sensor Fault Diagnosis in Natural-Gas Pipelines.....                                                                                      | 2036 |
| <i>Khadija Shaheen, Apoorva Chawla, Ferdinand Evert Uilhoorn, Pierluigi Salvo Rossi</i>                                                                        |      |
| IoT-Enabled hBN/AlGaIn/GaN High Electron Mobility Transistor for Carbon Dioxide Monitoring .....                                                               | 2040 |
| <i>Vikas Pandey, Ankur Gupta, Sudhiranjan Tripathy, Mahesh Kumar</i>                                                                                           |      |
| Low Complexity Dynamic Obstacle Detection for Intelligent Road Infrastructure .....                                                                            | 2044 |
| <i>Tiana Rakotovao, Paul Ménard, Carolyn Bernier</i>                                                                                                           |      |
| Flexible Stretch-Free, Liquid-Sealed Packaging Method for Ultra-Thin Silicon-Based Bending Sensor.....                                                         | 2048 |
| <i>Hao Liu, Michitaka Yamamoto, Seiichi Takamatsu, Toshihiro Itoh</i>                                                                                          |      |
| Unleashing Dynamic Range and Resolution in Unlimited Sensing Framework via Novel Hardware .....                                                                | 2052 |
| <i>Yuliang Zhu, Ayush Bhandari</i>                                                                                                                             |      |
| Air-Coupled Piezoelectric Micromachined Ultrasonic Transducers (PMUTs) for High-Resolution Distance Sensing .....                                              | 2056 |
| <i>Monica La Mura, Domenico Giusti, Carlo Luigi Prelini, Marco Ferrera, Alessandro Stuart Savoia</i>                                                           |      |
| A Passive Wireless Quasi-Harmonic Strain Sensor for Eternal Structural Health Monitoring.....                                                                  | 2060 |
| <i>Luca Colombo, Hussein M. E. Hussein, Walter Gubinelli, Ryan Tetro, Nicolas Casilli, Alessandro Banfi, Pietro Simeoni, Matteo Rinaldi, Cristian Cassella</i> |      |
| A Resonant MEMS Pressure Sensor Utilizing Higher-Order Mode Oscillation .....                                                                                  | 2064 |
| <i>Wenliang Xia, Bo Xie, Yulan Lu, Junbo Wang, Deyong Chen, Jian Chen</i>                                                                                      |      |
| Fully-Printed Sensor Based Extended Gate Field Effect Transistors for Wireless Monitoring of Potassium and Ammonium Ions .....                                 | 2068 |
| <i>Munia Ferdoushi, Mohammad Shafiqul Islam, Wenxin Cai, Sandra Lara Galindo, Md Farhad Hassan, Yasser Khan</i>                                                |      |
| A MEMS Gravimeter with Buckling-Beam Nonlinear Springs for Enhanced Sensitivity and Dynamic Range .....                                                        | 2072 |
| <i>Peyman Firoozy, Milad S. Haghighi, Mikhail Kanygin, Emad Esmaeili, Behraad Bahreyni</i>                                                                     |      |
| High Speed SPAD Active Quenching and Reset Chipset in 55nm BCDLite Process for Quantum Applications.....                                                       | 2076 |
| <i>Jun Zhang, Yuqi Su, Bin Zhao, Moe Thar Soe, Anh Tuan Do, Alexander Ling, Yuan Gao</i>                                                                       |      |
| High Conductivity Graphene-Based Composite EMI Shielding for RF Device Protection .....                                                                        | 2080 |
| <i>X. Zhang, D. Maddipatla, S. Masihi, S Hajian, B.B. Narakathu, M.Z. Atashbar</i>                                                                             |      |
| Human Presence and Attention Detection Through Stand-Alone Low Resolution Time-of-Flight Sensor.....                                                           | 2084 |
| <i>Lu Wang, Hemin Han, Ke Han, Shouwei Sun, Xiaodong Cai, Zheng Wan, Lili Ma</i>                                                                               |      |

|                                                                                                                                                                |      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| AC-Driven Aptamer-Decorated Graphene FET for Cortisol Detection.....                                                                                           | 2088 |
| <i>Ali Gilani, Ali Saeidi, Johan Longo, Yann Sprunger, Sadegh Kamaei, Adelina Ameti, Nicolas Niederländer, Nelly Pitteloud, Adrian M. Ionescu</i>              |      |
| A Smart, Energy-Efficient, and Low Cost Portable Device for Continuous Breath Analysis .....                                                                   | 2092 |
| <i>Rifaa Qadri, Geng Liu, Faizan Wajid, Mara Cai, Ashok Agrawala</i>                                                                                           |      |
| Microacoustic Shear Horizontal Lithium Niobate Leaky SAWs for Harsh Environment Sensing .....                                                                  | 2096 |
| <i>Walter Gubinelli, Luca Colombo, Ryan Tetro, Wen Sui, Nicol Maietta, Yvonne Sautriot, Pietro Simeoni, Philip X.-L. Feng, Matteo Rinaldi</i>                  |      |
| Bimodal Surface Acoustic Wave Sensor Based on Vanadium-Doped Zinc Oxide Film for High-Precise Pressure Measurement Enabled with Temperature Compensation ..... | 2100 |
| <i>Chuqiao Wang, Wei Gao, Guangyao Pei, Yunzhe Liu, Kai Cheng, Zheng Guo, Jian Luo, Binghe Ma</i>                                                              |      |
| A New Nonlinear Micromechanical Structure Used in MEMS Inertial Sensors .....                                                                                  | 2104 |
| <i>Milad Seifnejad Haghighi, Peyman Firoozy, Mikhail Kanygin, Emad Esmaeili, Behraad Bahreyni</i>                                                              |      |
| Suboptimal Joint Multi-Parameter Estimation for Wireless Sensor Networks Over K- $\mu$ Fading Channels .....                                                   | 2108 |
| <i>Youyang Xiang, Xianhua Shi, Qilong Du, Xianglu Li, Peng Fei, Dong Hou, Jie Tian</i>                                                                         |      |
| Towards Fabrication of Next-Generation Physical Sensors Through Integrating Suspended Sub-Micron Silicon Nanowires with Microelectromechanical Systems.....    | 2112 |
| <i>Basit Ali, Mehdi Bostan Shirin, Muhammad Muzammil, Ege Nacarkucuk, Sina Zare Pakzad, Umut Kerimzade, B. Erdem Alaca</i>                                     |      |
| Performance Evaluation of MEMS Vibration Sensors for Throat Microphones .....                                                                                  | 2116 |
| <i>Che-Yu Hsu, Po-Han Chen, Ting-Yi Chen, Shang-Yu Lin, Ching-Jen Wang, Chingwei Yeh, Tay-Jyi Lin, Pei-Zen Chang, Wei-Chang Li</i>                             |      |
| Multi-Modal Sensing for Enhanced Surface Roughness Prediction in CNC Machining Using an Intelligent Vise.....                                                  | 2120 |
| <i>Ho-Chuan Hsu, Shang-Yu Lin, Po-Han Chen, Pei-Zen Chang, Wei-Chang Li</i>                                                                                    |      |
| A Novel Flexible Blood Pressure Sensor Based on Ultrathin Silicon for Continuous Monitoring .....                                                              | 2124 |
| <i>Zeng Yi, Liu Hao, Yamamoto Michitaka, Takamatsu Seiichi, Itoh Toshihiro</i>                                                                                 |      |
| Highly Sensitive and Highly Specific Biomedical Sensing Device Development for Lung Cancer Tumor Marker .....                                                  | 2128 |
| <i>Chia-Hsu Hsieh, Cheng-Chuan Chou, Guan-Hong Chen, I-Yu Huang</i>                                                                                            |      |
| Ground-Engineered Planar CSRR-Array for Real-Time Nutrient Monitoring in Precision Agriculture.....                                                            | 2132 |
| <i>Nima Karbaschi, Amirhossein Yazdanicherati, Zahra Abbasi</i>                                                                                                |      |
| Speech Enhancement in Extremely Noisy Environments Based on Time-Frequency Harmonic Mask with Throat Microphone .....                                          | 2136 |
| <i>Yonghun Song, Yeeun Kim, Yunsik Kim, Yoonyoung Chung</i>                                                                                                    |      |
| Simulation Methods for Lock-In Pixels Considering Gating Driver's Response .....                                                                               | 2140 |
| <i>Ryosuke Suzuki, Keita Yasutomi, Keiichiro Kagawa, Shoji Kawahito</i>                                                                                        |      |
| Comparison of Optical and Capacitive Dew Point Detection Using COTS Components .....                                                                           | 2144 |
| <i>Malte Nilges, David Riehl, Klaus Hofmann, Ferdinand Keil</i>                                                                                                |      |

|                                                                                                                                                                                          |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Compact Room Temperature-Operated Sensing System for Methanol and Ethanol Mixture Separation and Quantification .....                                                                    | 2148 |
| <i>Meng-Qun Feng, Tanju Yildirim, Alexandru Nica, Kosuke Minami, Kota Shiba, Genki Yoshikawa</i>                                                                                         |      |
| Towards Wearable Acute Stress Detection and Mitigation via Real-Time Photoplethysmogram Feature Detection .....                                                                          | 2152 |
| <i>Farhan N. Rahman, Prabhkirat S. Bindra, Jesus Antonio Sanchez-Perez, Afra Nawar, H. Trask Crane, John A. Berkebile, Asim H. Gazi, Jin-Oh Hahn, Omer T. Inan</i>                       |      |
| Self-Coupling Laser Sensor Using Triangular Wave Chirp Modulation and Signal Intensity Detection: Method for Improving Low-Frequency Range Operation of Self-Coupling Laser Sensor ..... | 2156 |
| <i>Daiki Sato Norio Tsuda</i>                                                                                                                                                            |      |
| Fully Automated Rapid Immunofluidic Device by Use of Microfibrous Reactor for Human Saliva Sample .....                                                                                  | 2160 |
| <i>Yecan Wang, Kaito Maehara, Shigenobu Mitsuzawa, Satoru Shinkawa, Toshihiro Kasama, Ryo Miyake, Madoka Takai</i>                                                                       |      |
| A High-Precision Capacitive Absolute Angle Position Sensor with Improved Temperature Performance.....                                                                                    | 2164 |
| <i>Jiahui Shi, Bin Zhou, Qi Wei, Jianjun Ma, Rong Zhang</i>                                                                                                                              |      |
| Free Space Detection Using Automotive Radar .....                                                                                                                                        | 2168 |
| <i>Seon-Gyo Jeong, Sung-Joo Lee, Seul-Ki Han, Won-Sang Ra</i>                                                                                                                            |      |
| Ultra-High Frequency Photoacoustic Sensor Design for Early Stage Melanoma Diagnosis.....                                                                                                 | 2172 |
| <i>Elia Arturo Vallicelli, Giuseppe Chirico, Alessandro Michele Ferrara, Mirza Hassan Baig, Maurizio Marrale, Lorenzo Stevenazzi, Mattia Tambaro, Marcello De Matteis</i>                |      |
| Remote Sensing of Multiple Gases Emitted from Industrial Plants by an Ultra-lightweight Gas Chromatograph Installed on a Drone.....                                                      | 2176 |
| <i>Kazushi Yamanaka, Takamitsu Lwaya, Shingo Akao, Tatsuhiko Okano, Nobuo Takeda, Takahiro Kusama, Kanji Yamanashi, Hirokatsu Hirayama, Yasunori Kikuchi, Hideo Itoh</i>                 |      |
| Energy Harvesting Strategies for Plant Microbial Fuel Cells in Sustainable IoT Applications.....                                                                                         | 2180 |
| <i>Maria Doglioni, Roberto La Rosa, Matteo Nardello, Davide Brunelli</i>                                                                                                                 |      |
| Powering Wireless Sensors Using Magnetoelectric Wireless Power Transfer .....                                                                                                            | 2184 |
| <i>Orpita Saha, Shad Roundy</i>                                                                                                                                                          |      |
| Development of Unit Functions of Electrowetting-on-dielectric Digital Microfluidics.....                                                                                                 | 2188 |
| <i>Hyejin Moon</i>                                                                                                                                                                       |      |
| Early Screening of Lung Cancer Through Multi-Modal Gas Sensors-Based Breath Analysis Sensor System and Machine Learning .....                                                            | 2192 |
| <i>D.-S. Lee</i>                                                                                                                                                                         |      |
| Modeling of Synthetic Biology-Based Plant Sensors.....                                                                                                                                   | 2194 |
| <i>Yosi Shacham-Diamand, Aakash Jog, Adi Avni</i>                                                                                                                                        |      |
| Microneedle Array Patch as Biomedical Sensors in Collecting ISF and Subsequent Biomarker Analysis.....                                                                                   | 2198 |
| <i>Jongho Park, Beomjoon Kim</i>                                                                                                                                                         |      |
| Application of Super Fine Inkjet for Sensor Technology Adding Diversity with Micro Droplets .....                                                                                        | 2202 |
| <i>Kazuhiro Murata</i>                                                                                                                                                                   |      |

|                                                                                                                                       |      |
|---------------------------------------------------------------------------------------------------------------------------------------|------|
| Integrated Carbon Nanotubes for MEMS Applications.....                                                                                | 2203 |
| <i>Jongbaeg Kim</i>                                                                                                                   |      |
| Simulating Next-Gen Automotive Sensors: Physics Meets AI.....                                                                         | 2204 |
| <i>David Van Hamme</i>                                                                                                                |      |
| Wearable Sensors and Electronic Skin in Digital Driven Diagnostics, Prognostics, and Therapeutics<br>for Sustainable Health Care..... | 2205 |
| <i>Maria Sabrina Sarto</i>                                                                                                            |      |
| Recent Progress of Flexible Optical Sensor for Biomedical Sensing.....                                                                | 2206 |
| <i>Tomoyuki Yokota</i>                                                                                                                |      |

## **Author Index**